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**MAKING SENSE OF SCHOOL REFORM: A CASE STUDY OF  
MATHEMATICS AND SCIENCE TEACHERS' SENSEMAKING WITHIN ONE  
DISTRICT'S DIFFERENTIATION AND DETRACKING INITIATIVES**

by

Katelyn Daplyn Skinner

A Dissertation

Submitted to the  
Department of Educational Services and Leadership  
College of Education  
In partial fulfillment of the requirement  
For the degree of  
Doctor of Education  
at  
Rowan University  
March 27, 2017

Dissertation Chair: Jill A. Perry, Ph.D

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## **Dedications**

I would like to dedicate this manuscript to my husband, Chad, the hardest working person I have ever met. Without his support, love, and patience I would not be where I am today. And to my daughter, Madelyn, of all my accomplishments in life, being your mom has been my greatest. I would also like to thank my parents, Robin and Paula Daplyn, and my sister, Karly Daplyn O'Donoghue, who have unconditionally loved and supported me throughout my entire life. And a special thank you to my grandmother, Mary Alice Daplyn, who was always such a positive force in my life. I know she is smiling down on me right now.

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## **Abstract**

Katelyn Daplyn Skinner

### **MAKING SENSE OF SCHOOL REFORM: A CASE STUDY OF MATHEMATICS AND SCIENCE TEACHERS' SENSEMAKING WITHIN ONE DISTRICT'S DIFFERENTIATION AND DETRACKING INITIATIVES**

2016-2017

Jill A. Perry, Ph.D.

Doctor of Education

The purpose of this case study was to examine how individual science and mathematics teachers within a particular high school made sense of a district differentiation effort. A focus on teachers' perceptions and interpretations of this effort was targeted through the theoretical framework of sensemaking. Two of the teachers were present for an initial detracking reform effort, which enabled the researcher to examine their sensemaking of both initiatives.

There were clear differences in the sense that teachers made of the differentiation initiative. Additionally, there were multiple factors that impacted teacher sensemaking; the district initiative was not one of these factors. Consistent with prior sensemaking research, it was found that teachers' interpretations of the change were impacted by various contextual factors including: the number and scope of district initiatives, the clarity of the goal, the time and support provided, the professional development available, socialization factors, and prior experience with a detracking effort. Unless the teachers experienced some form of paradigm shift, they did not develop reformed instructional practices. Those who had engaged in prior professional learning experiences that fundamentally shifted their core beliefs about student learning and assessment, prior to the differentiation initiative, held the most complex understandings of differentiation and demonstrated the more reformed teaching practices than those who had not.

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## **Chapter 1**

### **Introduction**

#### **Teacher Perceptions and Educational Reform**

Over the past two decades, the field of education has undergone unprecedented change (Waddell & Vartuli, 2015). Many of these changes have a direct impact on classroom instruction and the way in which teachers carry out their curricula. Politicians, individuals removed from the educational field, are most often the ones making important policy decisions that set the course for new directions in schools. One particular area that has been the focus of public attention and reform nationwide is the Science, Technology, Engineering, and Math (STEM) field. The President of the United States discussed the importance of this field for the future of our children. The “STEM crisis,” termed by President Obama, is a growing concern that illuminates trending data showing that the jobs of tomorrow will require most students to be skilled in the critical areas of science and mathematics (Koebler, 2012; Rogers-Chapman, 2015).

The STEM crisis is chiefly based upon the concern that, internationally, U.S. students have been underperforming in science and mathematics. The most recent findings from the Programme for International Student Assessment (PISA) and Trends in International Mathematics and Science Study (TIMSS) show that American students ranked 20<sup>th</sup> overall in science performance and 27<sup>th</sup> in mathematics out of the 34 participating countries (Organisation for Economic Co-operation and Development, 2014; International Association for the Evaluation of Educational Achievement, 2015). These research findings have provided some of the basis for the adoption of new mathematics and science standards, the Common Core State Standards (CCSS) for

mathematics and the Next Generation Science Standards (NGSS) for science. The CCSS were adopted in the state of New Jersey in 2010 with the science standards set to be adopted in the fall of 2016. The state also adopted revised 21<sup>st</sup> Century Life and Careers standards in 2014 (New Jersey Department of Education, 2014). With the adoption of these standards, students not only need to be familiar with mathematics and science, but they will need to graduate with higher cognitive abilities in these areas. These new standards require students to go beyond the mere rote memorization of facts and reciting of definitions. They outline extremely challenging objectives that *all* students are required to learn. Additionally, there is agreement among scholars that higher-level classes in science and mathematics are vital for access to college preparatory courses in terms of educational opportunity (Nomi, 2012). Moreover, research suggests these courses also help to provide students with the fundamental skills that can help prepare them for 21<sup>st</sup> Century careers (Nomi, 2012; Paul, 2005).

The issue of requiring all students to graduate as college and career ready is not a new initiative in New Jersey. The release of the graduation requirements in 2009, calling for *all* students to graduate with proficiency in specific college-level courses, has been a topic of debate for quite some time in many schools. Since then, schools have interpreted and responded to this reform effort in various ways. The school under examination in this presented case study, Winston High School (WHS), responded by detracking its lower course levels to ensure students were receiving a college and career ready education. Additionally, after district test results showed major achievement gaps between the highest and lowest performing students, the school adopted a differentiation initiative.

Many studies have discussed the difficult nature of successful reform in the realm of detracking due to the shift in culture and beliefs that must take place (Alvarez & Mehan, 2006; Rubin, 2006; Wells & Oakes, 1996). These types of changes question many popular and traditional notions of teaching and challenge long-standing beliefs about who is capable of doing intellectually demanding work in the classroom (Spillane, Reiser, & Reimer, 2002).

**Traditional practices and tracking.** Over the past decade much research has been done on the brain and students' perceived abilities to learn (Dweck, 2008; Boaler, 2013). However, of all the governmental reforms initiated, none have aimed to effectively displace the traditional belief that students have fixed abilities and limited potential (Hart, 1998; Rattan, Savani, Chugh, & Dweck, 2015). One such practice that continues to uphold this common perception within many schools is that of tracking. Tracking or the grouping of students based on ability, is a popular practice in many countries but seems to be more prevalent and accepted in schools residing in the United States (Ansalone, 2010).

Although many definitions of terms associated with tracking exist, there are some common terms I will define below. In discussing the literature behind tracking and detracking, there are distinguishing characteristics among the two terms. *Tracking* divides students according to presumed ability based on multiple measures such as achievement on tests and teacher observations (Fiedler, Lange, & Winebrenner, 2002). *Detracking*, on the other hand, is a practice which places students of varying achievement, who would otherwise be separated, into the same classroom. Detracking is an uncommon practice,



but one that aims to dismiss the notion of students having fixed abilities or limits to their potential (Hart, 1998; Rubin 2006; Wells & Oakes, 1996)

The reason some schools have taken on detracking efforts is because tracking has been known to have a detrimental effect on student performance and achievement in school, particularly for those in the lower-level courses (LeTendre, Hofer, & Shimizu, 2003; Marsh & Raywid, 1994; Wells & Oakes, 1996). Although a plethora of research exists on the negative impact that tracking can have on students, most teachers continue to advocate for the practice within schools (Fine, Anand, Jordan, & Sherman, 1998; LeTendre et al., 2003; Marsh & Raywid, 1994; Oakes, 1992; Wells & Oakes, 1996). Many teachers believe that tracking students can help them to more appropriately tailor instruction to meet students' individual needs in order to make them more successful (Ansalone, 2010). At odds with teachers trying to individualize instruction through tracking is the notion that the practice is both unfair and inequitable for lower performing students.

**Efforts to detrack.** Efforts to detrack in different schools have had varying outcomes because these types of changes are multifaceted and connected to various other school practices (Oakes, 1992). Therefore, changing one teaching element within the school is unlikely to produce positive results (Oakes, 1992). When implemented effectively, detracking has the potential to open up new opportunities for students and increase achievement (Alvarez & Mehan, 2006; Rubin, 2006).

There is a broad assortment of detracking initiatives that make it hard to measure the success of them (Rubin, 2006). Various schools, implementing detracking efforts in very different ways, have found successes with the reform (Alvarez & Mehan, 2006;

Rubin, 2006). Some schools implemented it on a larger scale to eventually detrack the entire school, while others implemented it only in certain subject areas. Some other schools allowed students to self-select higher level courses if they wanted to enroll in them. Although there have been both negative and positive results of detracking, the most positive efforts have had a few things in common, including: “deep structural reform with pedagogical change...undergirded by an engagement with students’ and teachers’ beliefs around notions of ability and achievement” (Rubin, 2006, p. 7). Additionally, some best practices have been identified and include: building a diverse learning community, providing numerous ways for learning, giving strong academic and social support, building rigorous course expectations, keeping students engaged, creating a strong curriculum with cyclical big ideas, and challenging students to take charge of their learning opportunities (Alvarez & Mehan, 2006; Rubin, 2006).

Many of these beliefs revolve around the ideals behind the framework of differentiation. *Differentiation* is an educational philosophy that fosters the belief that students learn in different ways and along different trajectories. It also advocates for the active planning for student differences in the classroom (Tomlinson & Allan, 2000). Research has cited the development of district-wide goals of differentiated instruction (also referred to as DI) by some school districts as a means to support the detracking effort (Goddard, Goddard, & Minjung, 2015; Rubin, 2006; Valiandes, 2015). Although difficult to measure, differentiation efforts have been found to be successful in teaching to diverse groups of students when implemented effectively (Tomlinson & Allan, 2000).

## **Statement of the Problem**

The issue of placing students into leveled classes based on their future needs and projected career paths has long been a subject of debate (Haury & Milbourne, 1999). Although numerous studies investigate the impact of tracking and detracking on student achievement (Fiedler et al., 2002; Haury & Milbourne, 1999; Heath, 1999; Jones & Gerig, 1994; Marsh & Raywid, 1994; Nomi, 2012; Wells & Oakes, 1996), very little research has been done that explores the impact that teacher perceptions may have on efforts to create instructionally effective heterogeneous courses, especially in light of teachers making sense of challenging new reform initiatives (Coburn, 2001; Spillane et al., 2002).

In addition to studying the specifics of teacher perceptions regarding heterogeneous classes, exploring reform as a whole can be extremely beneficial. The problem with studying change initiatives is that not all policy is carried out as intended and oftentimes the variables that matter most are overlooked (Coburn, 2003). As society and education become more data-driven and results-oriented, there still remain untapped resources through which effective change can be driven. By focusing on teacher perceptions and the way in which teachers come to understand and consequentially implement change, researchers can better understand the process of impacting reform.

Various pieces of literature discuss the complexity of the change process and how the implementation of a reform does not necessarily lead to successful results (Durkheim, 1977; Fixsen, Naoom, Blase, Friedman, & Wallace, 2005; Glennan, Bodilly, Galegher, & Kerr, 2004). Glennan et al. (2004) claimed that although critical efforts were underway in the 1990's to understand the change process, the focus was often too narrow and was

mainly limited to measuring student outcomes (Fendt, 2010). Former studies on policy implementation fail to account for the role that teacher interpretations and learning have on the success of initiatives (Stein & Coburn, 2008). The process by which teachers come to perceive change initiatives, the perceptions that result, and the way perceptions are carried out in the instructional setting are largely unexplored components of the implementation process (Spillane et al., 2002).

Likewise, former studies on educator perceptions of detracking have focused on a wider spectrum of subject-areas and have found varying teacher perceptions of mixed ability courses (Ansalone, 2010; Hallam & Ireson, 2003; Wells & Oakes, 1996). There has been minimal research that examines detracking reform as it relates to science and mathematics, two subjects in which the United States performs the lowest according to international rankings (Organisation for Economic Co-operation and Development, 2014).

Along with variations of perceptions in different subject-areas, Kelly (2007) and Wells and Oakes (1996) argue that other research on detracking efforts do not sufficiently capture the disparity in how varying schools implement ability-grouping. Therefore, studying the particulars of the differentiation reform in this specific school context provides new insight into this type of change initiative. This study sought to explain these perceptions according to the teacher sensemaking theory in the face of controversial institutional change (Coburn, 2005; Spillane et al., 2002).

**A need to increase student achievement in New Jersey.** In his 2010 State of the Union address, former President Barack Obama appealed to communities and families by emphasizing the impact that advanced STEM education would have on global health and

curing long-time diseases. In response to the president's call for educational improvement, United States school systems have been charged with implementing major curriculum reform initiatives constructed by a combination of various educational stakeholders including: governmental administrations, professional associations, businesses, and colleges. Included in these changes are ideas involving the reorganization of schools, proposals for local control, adoption of new standards, new policy initiatives, and possibilities of parent choice of schooling (Burks et al., 2015). Nationwide, states have been adopting new and more challenging standards with the hope of graduating students with better critical thinking skills (Duncan, 2009). Teachers are also being expected to effectively reach deeper depths of learning. Overall, increasing student achievement seems to be at the forefront of most educational initiatives.

Prior to former President Obama's call for increasing student achievement, various other organizations outlined ways to improve the state of education nationwide. More specifically, in 2004, the American Diploma Project released a report that discussed the major shortcomings of an American diploma and the unpreparedness faced by many high school students (Achieve, Inc., 2005). As a result, an Education Summit on the state of High Schools convened in 2005, (Schneider & Harris, 2008) when leaders from the political, business, and education sectors met to discuss how to improve the state of high school education in the United States. One of the purposes of this summit was to come up with a plan to ensure that every graduating student left school with readiness for college and/or a career (National Governor's Association, 2005). The major outcome of this meeting was an agenda that called for three things: to raise the expectations of high school students, to identify more ways in which students might be provided with different

paths that will allow them to successfully graduate, and to improve the state of teaching and leadership within high schools. As a result of these initiatives, the following year, the New Jersey State Department of Education formed a committee called the New Jersey High School Redesign Steering Committee (NJHSRSC) that was charged with studying the status of high school education in New Jersey (Schneider & Harris, 2008).

**College and career ready education.** The findings of the NJHSRSC formed the basis for a secondary education redesign plan, laid out in a policy report titled NJ Steps Re-Designing Education In New Jersey For The 21<sup>st</sup> Century. This report outlined specific steps that the state of New Jersey would take in order to align high school regulations to meet the needs of students entering college and post-secondary careers (The New Jersey High School Redesign Steering Committee, 2008). According to the study, students were not being adequately prepared for workplace and college readiness (The New Jersey High School Redesign Steering Committee, 2008). An outcome of the data collected from the committee was the initiation of a reform effort in which all schools were expected to provide every child with a career and college preparatory education. One of the steps within this report included requiring that all students graduate with specific college-preparatory classes in specific subject areas.

In addition to enrolling all students in college-preparatory courses, schools would be required to adjust graduation requirements over a three-year period. For all freshmen entering in the 2008-2009 school year, the graduation requirements were for them to successfully complete Laboratory Biology, Algebra I, and four years of college preparatory English. Building on those requirements, students entering in the 2010-2011 school year were expected to successfully complete Geometry, Laboratory Chemistry,

and a third year of a laboratory science. As the final outcome, and in addition to the previous years' requirements, students entering high school in the 2012-2013 school year were expected to also graduate with successfully completing Algebra II (New Jersey Secondary Education Redesign Review Act, 2009; State of New Jersey Department of Education, 2009). The chart below, as shown in Table 1, identifies the graduation requirements that were established in the policy report generated by the NJHSRSC.

Table 1

*Summary of Graduation Requirements for Entering Freshmen Classes*

Entering Freshmen Class	Math Requirements	Science Requirements	English Requirements
2008-2009 2009-2010	Algebra I	Laboratory Biology	Four years of college preparatory English
2010-2011 2011-2012	Algebra I, Geometry	Laboratory Biology, Laboratory Chemistry, and a third year of a laboratory science.	Four years of college preparatory English
2012-2013 2013-2014	Algebra I, Geometry, Algebra II	Laboratory Biology, Laboratory Chemistry, and a third year of a laboratory science.	Four years of college preparatory English

*Note.* Adapted from “Revised High School Graduation Requirements Unanimously Approved by State Board of Education,” 2009. Copyright 2014 by the New Jersey Department of Education.

As a consequence of the reform effort that raised New Jersey's graduation requirements, districts all over the state began to interpret the change in policy in order to

adjust their schools accordingly. In response, many schools renamed their lower-level classes as college preparatory courses and adopted a revised curriculum. However, there were some schools that made quite different and more controversial changes. The schools that made more radical changes eliminated their lower-level courses completely, in favor of a more inclusive model. These schools ultimately made a more radical move in detracking students rather than repurposing the current system in place. This mini-detracking effort on part of some schools sheds light on opposing opinions in the realm of how to group students.

### **Purpose of the Study and Research Questions**

Specifically within the school under study, Winston High School (WHS), measures were taken to detrack the lowest level courses termed the “general” classes. Although a new initiative to implement differentiated instruction had taken place, there was considerable concern that the teachers’ prior experiences and beliefs about detracking were impacting how they were reaching lower achieving students. The purpose of my research was to examine how the high school teachers were making sense of the district’s differentiation effort and how they adapted instructional strategies in light of the sense they made. In order to understand the practices and perceptions held by teachers, it was important to target specific overarching questions within this topic area which included:

1. How do individual worldviews, experiences, and contextual factors impact the sense that teachers are making of the district differentiation goal?
2. How do individual experiences with detracking, in particular, impact the sense that teachers are making of differentiation?



3. How does sensemaking relate to the reformed differentiated methods of instruction enacted by the teacher within the classroom?

**Contextual importance of the research questions.** These questions are important to study because the way that teachers make sense of changes can have a major impact on student achievement and success (Fullan, 2007). Studying the prior experiences, contextual factors, and worldviews that impact the sense that teachers make of certain reform efforts may help to divulge important information in the realm of teacher learning. In particular, knowledge on sensemaking of differentiation and detracking may illuminate certain patterns not seen in other reform initiatives.

In addition to teachers making sense of reform, their specific experiences with detracking played a role in the sense that they were making of the differentiation initiative. There exists an ideology among some teachers that students need to be placed according to their abilities (Ansalone, 2010). However, minimal research finds any lasting positive effects of tracking on student achievement (Ansalone, 2010). Keeping this information in mind, I sought to further investigate how a differentiation initiative could impact the way that teachers taught to a more diverse group of students in the context of an original detracking reform effort.

In studying teachers who have had different experiences with detracking and varying backgrounds, I believed it was important to look for differences in teaching practices. Since teacher beliefs can have a strong influence on the way educators conduct themselves within the classroom, it was essential to understand the perceptions that they held (Argyris, 1990; Hallam & Ireson, 2003). My study sought to explore further into the sensemaking process by connecting patterns between sensemaking and implementation.

## **Significance of the Study**

Numerous studies have pointed to the fact that teachers are the most important variable in determining student success within the classroom (Fullan, 2007). If teachers are what matter most in schools, it is essential that their beliefs and practices be understood. The perspectives of teachers matter because they affect their practices most critically (Argyris, 1990; Hallam & Ireson, 2003). Understanding the perceptions of teachers in the realm of controversial change can help to reveal underlying logic behind beliefs and practices. Making connections between factors that were considered in teacher sensemaking theory and the perceptions of the differentiation initiative within the school being studied, was essential in determining how the reform was impacting implementation within the classroom.

This study contributes to the literature on educational reform in three ways. First, it builds upon previous studies on differentiation and detracking by adding the theoretical framework of sensemaking to the analysis. The process of change, to many individuals, can be seen as a struggle to try to turn the unknown into something more familiar. In large-scale changes, there is difficulty in the process and a need for persistent engagement with challenging ideas that will serve to continue to stimulate the reform progression (Spillane et al., 2002). If researchers can better understand the underlying patterns associated with teacher perceptions linked to change, then more valuable educational tools and resources can be developed.

Second, the study gathers qualitative data based upon initial perceptions of a controversial change initiative. A large number of previous studies have examined both positive and negative outcomes of detracking and differentiation at the surface level

(Alvarez & Mehan, 2006; Ansalone, 2010; Argyris, 1990; Kotter, 1996; Odden, 1991).

This study sought to examine the consequences of a reform initiated in 2009 and further revamped four years later. Researchers have shown how political forces similar to those that recreate inequities in the larger society can be reproduced at the local level when school districts are given the autonomy to implement policies on their own terms (Wells & Oakes, 1996). The issue of equity that arises in most discussions of tracking made this particular reform all the more important. Studying how teachers cognitively dealt with a reform effort in the context of differentiation might help to make future initiatives linked to equity more successful.

Third, the study makes a connection between teacher sensemaking and classroom instruction. Former studies have pointed out that the way in which implementing agents make sense of policy, understand the results, and deal with the consequences of changes are rarely analyzed (Spillane et al., 2002). Other research studies have analyzed student and teacher perceptions of tracking and detracking but very few studies have made explicit linkages between belief and practice in the realm of differentiation (Fiedler et al., 2002; Hallam & Ireson, 2003; Jones & Gerig, 1994; Kelly, 2007; Nomi, 2012; Oakes, 1987; Wells & Oakes, 1996).

### **Theoretical Framework: Sensemaking**

In case study research, theory development is critical to the design phase of the research (Yin, 1981; Yin, 2014). In this particular case, teacher perceptions of the differentiation effort were examined using the theory of sensemaking. In framing the research around this theory, it was important to consider the ways in which teachers at WHS interpreted the change effort. Sensemaking researchers have suggested that existing

worldviews, the social arena in which individuals work, and the nature of their connections to the initiative or policy influence the way in which teachers come to understand and enact educational policy (Coburn, 2005). Studies have also suggested that when teachers interpret policy messages, they do so by drawing on existing knowledge, which may lead to the reinforcement of existing practices (Coburn, 2005; Spillane et al., 2002). Taking these factors into consideration helped to form the basic outline of my research methodology.

**Defining “sensemaking” and levels of change.** Weick (1995) first defined sensemaking as the “making of sense,” as he described the way in which organizations interpret change (p. 4). He suggested that individuals base the sense that they make on previously related situations and assumed outcomes. Similarly, Spillane et al., developed a cognitive framework to characterize sensemaking in educational reform initiatives, stemming from research in cognitive processes, social cognition, and situated cognition (2002). They refer to sensemaking as a focus on the effort to bridge an implementing agent’s past body of knowledge and beliefs to the building of sense from current stimuli (Spillane et al., 2002). Therefore, an individual’s interpretation of a new message relies heavily on his or her pre-existing knowledge and experiences.

Research has suggested that there are three levels of change that can impact an organization when interpreting policy messages (Spillane et al., 2002). A *first level change* is one that is surface-level, requiring little to no reform. For example, changing the time of day in which science is taught would require no change in teacher instruction. A *second level change* necessitates reform to be made but does not require individuals to change existing expectations or to transform processes behind instructional practices. An

example of this might be adding a new unit to the science curriculum. A *third level change* is one that calls for the restructuring of teacher practice and thought processes behind instruction. These types of changes are the most challenging to attain but are also much more prevalent in recent educational reform initiatives (Spillane et al., 2002).

**Sensemaking in educational reform.** Many of the current educational policy initiatives call for major *third level* instructional changes to be made. These reforms are not impacting many school districts as they were intended. One reason for this is that local agencies interpret policy messages in different ways and at varying levels (Coburn, 2001; Coburn & Woulfin, 2012; Spillane et al., 2002). Some studies suggest that failure to implement policy is a result of the inability of administrators to effectively communicate the message, while others suggest problems with policy implementation are an outcome of unclear or unrealistic policy messages (Spillane et al., 2002). Successful policy implementation is attributed to teachers having clear goals, measurable procedures, and a method of monitoring (Spillane et al., 2002). But before teachers can implement a reform, they must first go through the process of sensemaking.

The way in which teachers make sense of change has an impact on the way in which the reform is implemented. It is essential to make a connection between the sense that teachers make of a change effort and the way in which it is implemented because understanding these patterns helps to provide insight on ways to effectively communicate with teachers and ways to make reform efforts more successful. It is also important because teachers hold the key to enacting effective reform at the ground-level. They are the ones who have direct contact with the students and the education that is provided to

them. In the field of education, teachers are the number one factor when it comes to making a positive impact on student achievement (Fullan, 2007).

Although teachers play the most important role in educational reform efforts, there are many other individuals within the school system who must communicate change. When there are numerous individuals interpreting policy at different levels within the school system, there may be opportunities for confusion to arise (Spillane, 1998). The questions of how each individual school handles and implements various mandates and how the teachers within the schools interpret these messages can be very difficult ones to answer because “individuals do not make sense of the world around them in a vacuum” (Spillane et al., p. 393, 2002). Teachers are surrounded by various other educational stakeholders along with certain contextual factors that vary from school to school. All of these items have an impact on the reform efforts that take place within a building. Individuals use their environments and make sense of new experiences through their prevailing knowledge structures and connections to various other contextual factors (Spillane et al., 2002).

Research suggests that the way in which teachers enact reform is impacted by numerous contextual factors and their understanding of the initiative (Durkheim, 1977; Fendt, 2010; Spillane et al., 2002). Furthermore, individuals are more likely to make important decisions based upon personal experiences, concrete information, and familiar examples rather than abstract information (Spillane et al., 2002).

An individual’s prior knowledge and experience, including tacitly held expectations and beliefs about how the world works, serve as a lens influencing what the individual notices in the environment and how the stimuli noticed are

processed, encoded, organized, and subsequently interpreted (Spillane et al., p. 394, 2002).

Therefore, a teacher's worldview can critically impact the way they interpret various changes within a particular school setting.

Studies have shown that individuals who are a part of different groups with varying worldviews, experiences, practices, and knowledge interpret policy messages in very different ways (Coburn, 2001). In the realm of this study, it was critical to explore these components in the context of the detracking reform. There is also a major connection between the ways teachers make sense of an initiative and the method through which it is carried out, which ultimately measures the success of the policy (Coburn, 2001; Spillane et al., 2002). By comparing and contrasting past practices with current practices through various artifacts, I was able to make a more concrete connection between the sensemaking process and implementation.

### **Scope of the Study**

I used qualitative methods to conduct a descriptive case study on science and mathematics teacher perceptions of a differentiation initiative that was implemented after the elimination of the lower level science and mathematics courses. Utilizing the case study methodology allowed me to focus specifically on science and mathematics at Winston High School. The circumstances surrounding the case I sought to study were that the teachers under examination took part in a schoolwide initiative to prepare students for college and career pathways by eliminating the general level courses, the lowest level of classes within the school. Over the past six years, since the initiative took place, students within the traditional lower- and middle-level tracks were grouped

together in the same courses. Then, five years after the detracking effort took place, a new differentiation reform was initiated to further support the move to make students more college- and career-ready.

The dissertation sought to make an argument for researching science and mathematics teacher perceptions in order to further explore how a recent differentiation initiative has played out after an initial detracking reform was implemented and perceived by teachers (Krathwohl & Smith, 2005). The dissertation presents a thorough literature review, which includes a content analysis of ability grouping, detracking, and differentiation along with an examination of the chronological development of teacher sense-making theories in relation to institutional change initiatives; a methodological framework inclusive of my case study research design and qualitative strategies of inquiry as they relate to the intricacies of my research questions; a description of specific sampling procedures, data collection techniques, data analysis measures, and ethical considerations; and a closing summary, which will reinforce the integration of teacher sensemaking theory into my research questions and methodologies. Additionally, the dissertation presents findings by discussing the various themes that were found as a result of coding the data. Lastly, the dissertation ends with the general and professional implications for the research along with concluding thoughts on personal practice and action.

### **Limitations**

In general, assumptions made by researchers in any study are conditional and falsifiable, which adds to the idea of research being imperfect. In addition to flawed research, studies are conducted by human beings, who have innate flaws that must be



acknowledged (Singh, 2015). Furthermore, participants in the interview process also have innate flaws. Asking teachers to recall past information based upon memories of a change process that took place approximately six years ago provided some limitations in terms of remembering specific details.

In looking at the various words used to describe tracking, I reflected upon my daily usage of terminology that suggests students have innate abilities. The educational culture continues to be dominated by deficit language, which may impact discussions (Paugh & Dudley-Marling, 2011). Throughout this study, I was careful about how I worded my interview questions so as not to inadvertently lead a teacher to use similar terminology that may have impeded the research process. I took a stand as an educational professional to no longer utilize deficit language and ensured that I went about using proper terminology. Additionally, I went into this study already under the assumption that teachers had negative opinions of the original detracking initiative that eliminated the general level courses. Due to this, I had to take extra precautions to avoid confirmation bias in which I was looking for answers that would further confirm what I assumed to be true (Singh, 2015).

Another possible limitation I thought I would come across in studying differentiation was that it has no clear cut procedures (Brimijoin, 2005). The strategy lends itself more to best practices that support student success rather than a prescribed list of techniques. As I tried to make connections between instructional practices and teacher perceptions, I knew that identifying certain techniques as differentiated ones would possibly pose a problem. However, I utilized an instrument that will be discussed later to assist in identifying consistent techniques during data collection.

## **Chapter 2**

### **Context of the Case Study**

The detracking effort at WHS caused many issues for teachers who did not know how to teach to a more diverse classroom and set of students. School data on the state's high school proficiency assessment (HSPA) showed that between the years of 2009 and 2014, major disparities existed between the highest and lowest performing students. Therefore, five years after the detracking initiative, the WHS administrators outlined a district professional development goal of differentiated instruction that all teachers within the school would be required to follow. Although this goal aimed to assist struggling teachers, the teachers had difficulty with implementation at first. This was not surprising, given the fact that many individuals often struggle with large-scale change (Kotter, 1996).

Large-scale change efforts within school systems can be difficult to implement, especially when no clear direction is given (Fullan, 2007). In response to the state's change in student graduation requirements, schools in New Jersey could have chosen a simpler reform effort by renaming their lower level courses. However, some chose not to do so and implemented more radical measures. Winston High School decided to completely eliminate their lower level courses, referred to as the "general classes," and include all students in the classes that were, at the time, deemed "college preparatory."

#### **One School's Initial Response**

Before the new state graduation requirements went into effect, Winston High School's Curriculum Supervisor wanted to be proactive. In the spring of 2009, subject-area leaders at the school were asked by the administration to poll the faculty on their

feelings about eliminating the general level classes in order to make students more college and career ready. There were varying opinions at the time on the topic but many teachers hated the idea. Teachers closed out that school year unaware of the plan to eliminate these courses in order to make students more college and career ready.

**Teachers respond with frustration.** After summer break, when the building reopened the following school year, teachers found that the general level classes had been eliminated from the ninth and tenth grade schedules. Many teachers were upset about this change. Teachers expressed their frustrations at faculty meetings and in the annual school climate survey. The elimination of the general classes was a change that had been pushed mainly by the Curriculum Supervisor. Due to the traditional culture of Winston High, she felt as though there would be no other way for this change to occur. In hindsight, the Supervisor of Curriculum, who has since left the district, felt as though it was not the best way to go about initiating effective change but did not see how she could have gotten any buy-in.

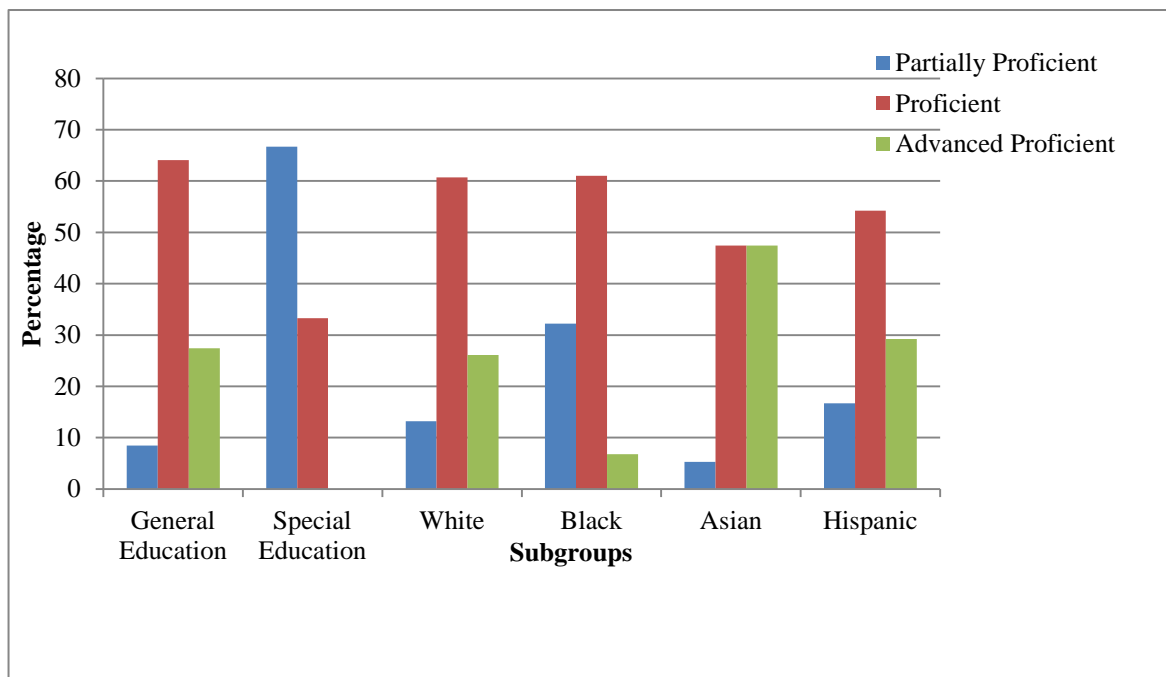
**Mixed messages from administration.** Along with a majority of the teachers seeing the reform in a negative light, many administrators were against the idea as well. At one of the early high school faculty meetings, the principal specified that teachers would not lower their standards for the detracked classes. He also discussed the notion of a “sink or swim” mentality in the classroom, where teachers would not slow down instruction for students who might be struggling. In other words, the principal had interpreted the reform to mean that lower-performing students would be held accountable to higher standards of achievement with little change to the instructional classroom.

**More changes on the horizon.** All general-level classes, excluding some of the upper level science classes and integrated mathematics courses, were eliminated from the high school in the 2009-2010 school year. In the following years, the mathematics classes were all deemed “college-preparatory.” As the school had seen many administrative changes and educational reform efforts based on teacher accountability, conversations to bring back the general level classes began almost immediately after they were eliminated. These conversations were being brought up because teachers struggled and were given no guidance as to how to effectively teach in classes that were more heterogeneously mixed.

In 2013, new teacher accountability measures involving student performance were put in place along with the revamping of the school’s curriculum to meet the new CCSS and NGSS. This change made teaching to a more diverse group of students even more challenging. At this point, teachers were being held accountable to instruct their lessons to meet the needs of every child. In order to achieve this, teachers needed to strategically work with varying levels of learners throughout the day. However, since they were never taught how to do this, they began to discuss how they might bring back the general level classes. This is because many teachers believe that tracking students can help them to more appropriately target specific learners and abilities within the classroom (Ansalone, 2010). Teachers in committee meetings, PLT meetings, and faculty meetings brought up bringing back the general-level courses in order to help them to better meet the needs of their students.

**Unpromising state test results and new administration.** Not only were the teachers discussing the potential to bring back the general level classes, district test results were showing major gaps between the highest and lowest performing students (see

Figure 1). Administrators in the school began discussing the data along with a plan of action to help the district's lower performing sub-populations. All of the building and district level administrators agreed that bringing back the general level courses would be a mistake because of the negative connotations that came with the courses and how difficult it was to get teachers to want to instruct these classes. Meetings also led to discussions about the negative research behind tracking and how it might negatively impact the lower performing students.



*Figure 1. Mathematics proficiency percentages by subgroup: 2013-2014. Histogram representation of proficiency levels among varying subgroups of students at WHS. The most notable difference in performance can be seen by comparing the general education population partially proficient scores to those of the special education, black, and Hispanic populations.*

It was agreed upon by both district and building-level administrators, that the teachers needed a strategy to teach to a more diverse class. With a new team of district-

level administrators recently hired to be a part of what was called the “curriculum team,” the focus on a targeted initiative was possible. Therefore, in response to struggling teachers and district data, the following year, in 2014, the district office administrators decided to implement a professional goal of differentiation for the entire district. As a part of all teacher Professional Development Plans (PDPs), individuals were required to establish how they would target differentiation for the upcoming school year.

### **Year One of Differentiated Instruction: A Delayed Response**

The effort to try to effectively reach all levels of students in order to provide them with a college and career ready education was then being addressed through the school initiative of differentiation. In the Spring of 2014, the curriculum team spent time crafting a differentiated instruction goal for the teachers to include on their PDPs for the following school year. The first goal on the document, which all teachers were required to review and create a plan of action for, read:

From July 1, 2014 through June 30, 2015, teachers will be able to choose appropriate *differentiated instructional methods and learning activities* (i.e.

Universal Design for Learning) to address the unique and diverse academic needs of students through effective and appropriate implementation.

As a part of their PDPs, teachers were required to write down activities they would do in order to meet the outlined goal on the PDP form.

In addition to the differentiation goal, there were four other goals that needed to be accomplished. Teachers also needed to construct and implement common summative assessments in their subject-areas, integrate new standards, prepare students for the upcoming PARCC assessments, and align two more goals to the new teacher evaluation

model (Marzano). Along with these goals, it was also the second year for the implementation of Student Growth Objectives (SGOs). Furthermore, the teachers were adjusting to a newly implemented school schedule called the “SMART” schedule, which changed the length and scheduling of class times.

Although the new SMART schedule added more change to the school, the larger transformative changes that were required came from the district goals on the school’s PDP plan. During the first year of implementation, teachers wrote down general activities they would perform in order to reach the various district goals, including the differentiation goal. As the school year began, the instructional supervisors of the school began speaking to teachers about inputting differentiated activities into their lesson plans and trying to incorporate some of these ideas into their lessons. At the end of the second marking period, the curriculum team at WHS, which consisted of the head of curriculum, the Science, Technology, Engineering, and mathematics (STEM) Supervisor, the English/Language Arts (ELA) Supervisor, the Elementary Supervisor, and the Supervisor of Special Education decided to incorporate differentiating instruction into lessons plans as part of the teachers’ final evaluations. Teachers were expected to have a differentiated component in their lesson plan on a weekly basis and it would be rated at the end of the year.

**Initial teacher reactions to differentiated instruction.** At first, the teachers seemed to agree that differentiated instruction was a meaningful goal to undertake as a district. However, once the goal became linked to accountability and evaluations, many frustrations arose. Many teachers commented that they had never learned about the definition of differentiation or district expectations of the framework. They wanted to

know specifically what it should look like in the classroom and receive specific training for it.

In the past, teachers had not been held accountable for following the district PDP plan. They had also never been expected to maintain a certain structure to their lesson plans or for detailing specific items within them. Individuals were vocal about their frustrations in leadership committee meetings, professional learning community meetings, and faculty meetings. As a result, the curriculum team decided to temporarily remove the requirement for differentiation in the lesson plans as part of the teacher evaluation process.

**Further developing the reform: Administrative reactions.** The curriculum team then went to work on setting up professional development opportunities for teachers to develop a shared vision of differentiation for the district. Teachers could attend these on a volunteer basis in order to learn more. After initial volunteer workshops, the curriculum team met with the subject-area department chairs and discussed what they thought a shared vision might be for differentiation. Collectively, a shared vision was developed by the end of the school year and a new, more specific PDP was created for the teachers for the following school year. Various school committees were also consulted about the set-up of the differentiation goal in the PDP. The new goal read:

From July 1, 2015 through June 30, 2016, all teachers will explore, choose, and implement appropriate differentiated instructional (DI) methods that address the unique and diverse academic needs of students through effective and appropriate implementation. Teachers may choose one of the following DI strategies to focus: low prep & high prep strategies, teaching with differentiated resources, student



choice, technology, flexible grouping, Universal Design for Learning or Problem-Based Learning.

The new goal, going along with the philosophies of differentiation, allowed teachers to choose which specific strategy they might focus on for the following school year. It also came along with goals similar to the previous year that teachers needed to target.

During the summer, the curriculum team worked to create a plan that would support the teachers in their goals to implement more differentiated activities in their classrooms. They set up a schedule to allow teachers to meet with a designated cohort, based upon their preferred differentiated learning strategy, in order to discuss ideas and implement strategies to share with one another. The cohorts were led by curriculum team members, principals, and assistant principals. The shared vision and definition were incorporated along with share sessions to include challenges and struggles of various strategies. At the time of this study, the differentiated instructional philosophy continued to be embedded into teacher workshops after school and indirectly in teacher evaluations as opportunities for teachers to score higher in their ratings.

## **Chapter 3**

### **Literature Review**

One of the primary purposes of research is to make a connection to the world in which we live (Hart, 1998). In order to make these types of linkages, it is essential to review relevant literature to evaluate and critique studies that have been previously done that are related to the topic at hand (Hart, 1998). In this literature review, I discuss the controversy and debate behind tracking students. I then discuss the research behind detracking reform initiatives and those specifically dealing with differentiation. Finally, I relate this content analysis to the theoretical framework that drives the research, that of teacher sensemaking theory. I begin my review by discussing some of the beginning history behind tracking and why it became and continues to be a controversial subject in the United States.

#### **The History of the Tracking Debate and Links to Equity**

Throughout history in the United States, there have existed periods of reform in which varying educational opportunities for students were sought. In 1954, the Supreme Court's *Brown v. Board of Education* decision sparked one of the most controversial reform efforts to ever hit our national education agenda in the form of the desegregation of our school systems (Kirst, 2004). In addition to equity in education, another agenda had started to garner public focus in response to international competition. With the 1957 launch of Sputnik, the world's first satellite created by Russia, major focus was placed on advancing students in science and mathematics (Kirst, 2004). Then, during the 1960s and 1970s inequitable educational practices gained national attention once again as President Lyndon B. Johnson launched the Elementary and Secondary Education Act in 1965. At

this point, the increasing achievement gap had started to gain national attention and, once again, a focus on equity was given top priority within our schools.

As the 1970s approached, educational reformers started to question the methods of local school districts in their instructional practices specifically dealing with minority student subgroups (Kirst, 2004). President Johnson had moved forward with the ESEA to expand opportunities to children in special needs categories who had previously been neglected (Kirst, 2004). At this point in time, numerous studies were performed that demonstrated the negative impact of tracking on minority individuals and efforts to detrack came into effect (Marsh & Raywid, 1994; Wells & Oakes, 1996). Since then, the literature on heterogeneous classes has presented numerous findings on the effects of these tracked courses on the learning outcomes of students (Fiedler et al., 2002; Haury & Milbourne, 1999; Heath, 1999; Jones & Gerig, 1994; Marsh & Raywid, 1994; Nomi, 2012; Wells & Oakes, 1996).

In the United States, the earliest forms of tracking started within the urban schools of Northern America and were used to separate newly arriving immigrants along with poor Southern blacks (Ansalone, 2010). The passage of compulsory education policies turned the urban school into the factory-like classrooms. Even within these schools, students were separated based on their abilities. Pupils were being set-up to learn the knowledge that would be the most appropriate for them based on their social status (Ansalone, 2010). This separation by ability was not questioned during the time. However, as society evolved and schools were being held more accountable for equitable practices and closing the achievement gap, the separation became controversial (Oakes, 1987).

**Proponents of tracking.** As with any controversial topic, there exist two sides to the debate over whether students should be tracked. Proponents of tracking argue that it helps to guide instruction by individualizing it and allowing teachers to modify their teaching strategies based on the level of student (Ansalone, 2010; Carrell, Sacerdote, & West, 2013; Kirkland, 1971; Turney, 1931). Additionally, researchers suggest that tracking excludes the likelihood that higher-level students will develop boredom because of the slow movement of the class (Carrell et al., 2013; Kirkland, 1971; Turney, 1931). Furthermore, advocates argue that the practice will encourage the participation of lower-performing learners, as they will feel more confident in a setting of students similar in perceived ability (Carrell et al., 2013; Kirkland, 1971; Turney, 1931).

In addition to those who propose that tracking is beneficial for students, there exist numerous perspectives about the purpose of schooling that also support the practice (Ansalone, 2010). Some individuals believe in what is referred to as the “efficiency perspective,” where they feel as though schools are meant to channel students into their respective careers, which should mirror the level of courses in which students are participating (Ansalone, 2010). Other supporters rely on the “self-development perspective,” in which they believe that tracking serves as a pedagogical tool that aids student learning and self-efficacy (Ansalone, 2010).

Even more varied research in favor of tracking exists that discusses some major differences between the interactions of students with varying abilities within the different set-ups of leveled classes (Jones & Gerig, 1994). Researchers of one particular study explained that in heterogeneously mixed classes, lower-achieving students were less likely to interact than in homogeneously grouped courses while the higher achieving

students interacted more often in the mixed ability classes (Jones & Gerig, 1994). African American students were found to interact more often in classes including students performing in the same range of abilities. In terms of preferences, the study found that lower and average achieving students wanted to be placed in heterogeneous classes while higher achieving students preferred to be in classes with other high ability individuals (Jones & Gerig, 1994).

The philosophy of homogeneous grouping is that it provides necessary challenges to gifted learners whose needs cannot be met from classes consisting of mixed-level students. Additionally, some research has suggested that misplacing gifted students can have a negative impact on their educational possibilities (Fiedler et al., 2002). Furthermore, Fiedler et al. state that ability grouping no longer discriminates against racial and ethnic minorities as tests are becoming less culturally biased (Fiedler et al., 2002). Fiedler et al. (2002) argue that educating students appropriately should not be a choice between teaching for excellence versus equity. Rather, higher ability groups should be allowed to receive education among similarly leveled students so that they may benefit to their fullest capabilities (Fiedler et al., 2002).

**Opponents of tracking.** Although some individuals find advantages with ability grouping, there exists limited research that tracking is beneficial for students. Opponents of tracking take on more of a “critical perspective,” in their beliefs that the practice represents a method for the reproduction of social status among students (Ansalone, 2010). It has been found that teachers more often stress independence and decision-making with those in the higher tracks while they emphasize obedience and acceptance in the lower ones (Ansalone, 2010). These findings demonstrate that teacher perceptions of

the differences between these groupings can critically impact the way courses are taught within a school system.

On one hand, literature on tracking has found that students within the lower and middle-level classes often are held to lower standards than students in higher ability courses (Marsh & Raywid, 1994; Wells & Oakes, 1996). Students within these classes receive an inferior curriculum, which causes them to fall behind their peers (Oakes, 1992). Studies have also shown that there are differences in content and quality of instruction delivered to those students tracked within different levels, where higher tracked students receive a better quality of instruction along with more challenging content (Oakes, 1992). Moreover, students within these lower-level courses are less likely to benefit from post-high school educational and career opportunities (Marsh & Raywid, 1994; Oakes, 1992).

Findings show that typically the higher track classes are assigned to more experienced teachers while the lower track ones are given to less experienced teachers (Marsh & Raywid, 1994). Teachers of the higher track classes typically are found to provide more time for student learning to occur, are more energetic, have better organizational skills, use less criticism, and provide more opportunities for active learning (Oakes, 1992). Furthermore, the teachers of lower track courses have lower expectations of students which negatively impacts motivation and career choice (Oakes, 1992). Additionally, students in lower-level classes receive less motivation from their peers and are therefore likely to achieve less. According to some scholars, tracking places students in educational environments where moving to different levels can be virtually impossible and therefore leads individuals toward opportunities where educational

success is minimal (Fiedler et al., 2002). All of these factors contribute to lower track students having fewer opportunities to be successful in the 21<sup>st</sup> Century workforce.

**Equity and tracking.** Other negative consequences of tracking and ability grouping introduce the issue of equitable educational opportunities for all children, especially those of minority groups (Wells & Oakes, 1996). Occurrences of tracking have even been denounced as opportunities for those of the dominant class to reinforce segregation policies within schools at the local level (Marsh & Raywid, 1994; Wells & Oakes, 1996). Studies have shown that lower tracked courses have higher percentages of minority students in them than higher level courses (Heath, 1999). Common ideologies, still in existence today, continue to undermine the intelligence capacity of African American students, which may contribute to why minority students are often placed in lower level tracks (Delpit, 2012). Delpit (2012) argues that African American students, in particular, are not born with achievement gaps. Research has suggested that black infants surpass their white peers in intelligence (Delpit, 2012).

Although studies have shown that black children are not born with an achievement gap, one wide-known reading, *The Bell Curve*, continues to suggest that white individuals have higher intelligence capacities (Delpit, 2012). In this particular book, Herrnstein and Murray (1994) discuss the notion of intelligence being influenced by genetic factors. They talk about how it is linked to social forces that can lead to misfortunes often associated with those of lower socioeconomic status. If intelligence is linked to genetics and our academic capacity is predetermined before schooling begins, then some individuals may find that tracking does serve a beneficial purpose. However, critics of *The Bell Curve* argue that there are numerous other factors that contribute to

potential ability of individuals and their performance in society, including education, motivation, and environment (Heckman, 1995).

There are other influences that are linked to increasing student potential, and tracking has not been found to be one of those (Oakes, 1996). Despite the abundance of research that exists on the negative effects of tracking, administrators and teachers continue to advocate for the practice (Ansalone, 2010). More recent research has focused on trying to understand why individuals favor this type of structure (Ansalone, 2010). Some people believe that tracking helps to eliminate the wide range of academic diversity within the classroom that is often difficult to manage. Furthermore, teachers remain uncertain of different teaching strategies aimed to address academic variety within the classroom (Ansalone, 2010).

### **The Successful Implementation of Detracking**

Although various teachers remain uncertain as to how to address diverse learners in the same class, literature on detracked schools has suggested that many factors need to be put in place in order for the reform to be successful. One study found that initiatives dealing with detracking were more often idealized than accomplished in school systems (Gamoran & Weinstein, 1995). When schools detrack and do not put strategies into place, negative consequences can arise for different types of students. Nomi (2012) discusses the results of what can happen when schools are not detracked effectively:

Thus, detracking tends to have negative consequences on high-skill students due to declines in peer ability levels especially when additional instructional supports are not provided to low-skill students to help them learn more rigorous content. For example, in detracked high schools, high-performing students are likely to



become bored and disaffected in classes with lower skill peers (Nomi, 2012, p.490).

This research suggests that heterogeneous courses aimed to target all types of learners with specific curricular goals can be detrimental to students at both higher and lower levels of achievement if not implemented correctly. Teachers, school counselors, and many administrators tend to agree with this research, as they struggle to manage the variety of learners present within their classes (Nomi, 2012).

Individuals who point out the disadvantages of homogeneous grouping do not go into specific detail regarding the ways in which detracking can successfully be implemented at the classroom level. Studies at the classroom level have indicated that grouping students in a heterogeneous manner may provide more students of diverse backgrounds with opportunities to maintain high expectations of themselves along with confidence in the realm of science and mathematics (Wells & Oakes, 1996; Wood, 2009). At the district level, research suggests that there are common characteristics that can be found in schools, as a whole, that have been detracked with success. Some of these features include: incorporating professional learning communities that discuss the importance of contributions from diverse learners, providing opportunities for teachers to learn about diverse ways of learning, challenging all students, providing academic and social supports, keeping learners actively involved, giving personalized assessments, integrating cooperative grouping, and building a challenging curriculum (Alvarez & Mehan, 2006; Oakes, 1992; Rubin, 2006). Combinations of these characteristics seem to exist in successfully detracked schools.

## **Differentiation: A Strategy to Aid in Detracking**

Various detracked schools have used components of *differentiated instruction* to more appropriately address a more diverse group of students within individual classrooms (Goddard et al., 2015; Rubin, 2006; Tomlinson, 1995; Valiandes, 2015). The main principles of differentiation stem from Vygotsky's, socio-cultural theory. They emphasize the importance of the reciprocal connection between the teacher and learner and the significance of purposeful planning for student differences (Subban, 2006).

Along with proposing guiding principles (Subban, 2006), researchers have identified that differentiation is meant to serve two main goals. The first goal is to ensure student achievement toward grade-level state standards. The second goal is to provide tailored instructional strategies to individual struggling students (Lawrence-Brown, 2004). Along with discussing the purposes of the strategy, various pieces of literature discuss ways to go about implementing differentiated instruction (Lawrence-Brown, 2004; Tomlinson & Allan, 2000). Furthermore, more recent research has studied the impact that differentiated instruction has on student achievement and found it to have a positive relationship (Brimijoin, 2005; Stavroula, Leonidas, & Mary, 2011).

## **Teacher Perceptions of Detracking and Differentiation**

Although studies point out positive relationships between differentiation and student achievement, there still exists an insufficient body of research that discusses effective implementation by teachers (Subban, 2006). Since research has suggested that differentiation has the best chance of being effective if all teachers are committed to the change, studying their perceptions might prove to be meaningful (Lawrence-Brown, 2004). However, there exists minimal research on specific teacher perceptions of a

differentiation initiative within a school. One study examined teacher perceptions of differentiation in a middle school setting (Tomlinson, 1995). The research outlined a case study approach that examined factors that both impeded and facilitated a district-led differentiated instruction goal for the school (Tomlinson, 1995). However, the research does not make specific connections between instruction and perceptions, nor does it link contextual factors to the change initiative. Additionally, studies have indicated a need to further study how teachers have more specifically adapted their strategies in the realm of a detracking initiative (Subban, 2006).

Another study conducted in the United Kingdom examined the attitudes and beliefs of ability grouping of 1,500 teachers from 45 secondary schools. The research found that teachers had varying beliefs about heterogeneous classes depending on the subject they taught, the school they worked within, and their experience and qualifications (Hallam & Ireson, 2003). Mostly, teachers of the humanities felt more positive about mixed-ability grouping than those of mathematics. Science it seemed had both proponents and opponents (Hallam & Ireson, 2003). Teachers who taught within schools where ability grouping was minimized along with those who had more teaching experience felt more positively about mixed-ability classes. Teachers who had higher educational degrees expressed more negative attitudes toward the practice of tracking (Hallam & Ireson, 2003).

As a part of their methodology, which included a questionnaire exploring teacher attitudes about mixed ability grouping, the researchers included specific quotes from teachers about the practice. The teachers who had more negative attitudes toward mixed-ability grouping felt as though higher ability students were not being stretched to their

potential and that curricula should be matched to capabilities of the students (Hallam & Ireson, 2003). The teachers who had positive beliefs about mixed-ability grouping felt as though students in these heterogeneously classes had higher self-esteem and more academic and social potential (Hallam & Ireson, 2003).

Although this previous study highlights many important beliefs about the impact of tracking on students, it does not fully address the extent to which perceptions and sensemaking can influence change initiatives and impact instructional strategies. It also does not discuss the reason behind the negative perceptions of tracking related to large-scale school reform and the ways in which individuals interpret changes. Furthermore, the study does not illuminate specific reform efforts taken to detrack students.

### **Detracking and Differentiation as a Reform Effort**

The effort to detrack and implement a district differentiation goal falls within a broader framework of trying to enact effective reform within an institution. Teachers, in particular, have been known to be resistant to change efforts within school systems with well-established cultures (Argyris, 1990; Fullan, 2007). A possible contributing reason teachers hold negative perceptions of detracking may be because it is a part of a larger change initiative, currently uncommon in present school systems (Coburn, 2003; Spillane et al., 2002).

Although detracking may invoke negative perceptions, the study of reform efforts, in general, did not always provide the most promising results in the hope for enacting effective change. In the 1960's studies conducted on new policy initiatives shed light on the abuse of implementation to varying degrees (Odden, 1991). Findings indicated that funds were misappropriated, services were provided to the wrong individuals, there

existed a lack of capacity on part of the initiators, and resistance to change was prevalent (Odden, 1991). These findings brought about negative feelings among politicians that educational change was an impossible feat to conquer.

As newer studies began to emerge, data continued to show negative findings linked to change within systems. Beginning in the late 1970's further research was conducted that studied the ways in which educational policy was interpreted at the classroom level by the teachers (Berman & McLaughlin, 1978; Weatherley & Lipsky, 1977). Some researchers attributed this misinterpretation of policy to a lack of knowledge on part of the teachers (Berman & McLaughlin, 1978; Odden, 1991). Others claimed that teachers were likely to alter possible implementations by adapting changes to fit their own agendas (Berman & McLaughlin, 1978; Weatherley & Lipsky, 1977).

As current studies have been showing a more promising side for reform efforts, there exists hope among many scholars that change within schools is possible and can be successful. In the 1980's, various studies suggested that favorable reform efforts have been the result of externally mandated policy initiatives (Cuban, 1986; Rowan, 1982). However, new findings have suggested that the successes of externally mandated policies depend largely upon the contextual factors of school systems and the ways in which implementing agents interpret and decide how to go about a reform effort (Spillane et al., 2002).

More recent studies have begun to look specifically at teachers' interpretations of change as a part of their learning process (Coburn, 2005). These studies have come to find that teachers are more able to adapt to new initiatives by using their previous knowledge base in order to interpret and adapt to the changes (Coburn, 2005). Although

research has suggested ways in which individuals have made sense of particular change initiatives, there is a lack of literature on the way in which perceptions impact change initiatives and the specific instructional strategies at hand (Spillane et al., 2002).

### **Teacher Sensemaking: A Review of the Theoretical Framework**

As the history of research on institutional reform has progressed, possibilities for initiating changes have become more promising. Although some researchers argue that policy initiatives are externally driving schools toward effective reform, others believe that change is most impacted by the internal working environment (Coburn, 2001; Cuban, 1986). According to sensemaking theorists, effective reform efforts need to take numerous factors into consideration such as interpretations of the change, the environment in which the reform was initiated, and the way in which the change was implemented (Spillane et al., 2002). It has been suggested that the main problem of policy implementation is that of teacher learning (Coburn & Stein, 2006). A major theoretical framework that surrounds the issue of educational reform on part of the teachers is that of sensemaking and the factors that surround it (Coburn, 2005). Studying teacher sensemaking in the context of a controversial detracking effort will help to explore hidden perceptions on the change initiative.

Teacher sensemaking, in particular, is unique in that cognition is affected by interactions with other peers, working conditions, and school culture (Coburn, 2005). Sensemaking is not an individual endeavor; it is social in two essential ways. The first is that it is collective in that individuals make sense of policy messages through interactions with colleagues, through the environment, and in conversations. As a result, they construct shared understandings among fellow teachers, which are reflective of the school

culture, beliefs, and customs (Coburn, 2001). The second major component of sensemaking is that it is situated in school contexts. More specifically, sensemaking can be largely impacted by customs and norms of various departments and other groups among which teachers collaborate (Coburn, 2001).

**The importance of interpreting change.** Studying perceptions of the implementers of a reform initiative, or the teachers, helps to shed light on current beliefs and practices taking place within the classrooms. Research has suggested that in school reform efforts teachers' understandings of instructional policy has been influenced by their prior knowledge, their school environment, and their connection with the change initiative (Coburn, 2005). Theorists in this field have argued that school culture, structure, and routines are a result of "micro-momentary actions" taken by school staff members (Coburn, 2005, p. 487). In other words, individual actions are an outcome of the ways in which people perceive their environment and make meaning of it and understand the policy message (Spillane et al., 2002). In order to process new information, individuals place new knowledge into their pre-existing worldviews. As an output of reform, they naturally will adapt the change to fit in with their previous actions or they will make incremental changes in the process of evolving (Coburn, 2005).

Therefore, teachers are likely to feel more positively about reform efforts that are in line with their past practices. Those efforts that are unfamiliar are adapted to fit into existent classroom norms (Coburn & Stein, 2006). It has been found that the implementers of policies may intentionally ignore or selectively attend to policies that are inconsistent with their own beliefs (Spillane et al., 2002). Examining implementers' ways

of interpreting policy as a way of the implementation process is a topic largely unexplored (Spillane et al., 2002).

**The various factors that impact sensemaking.** Teachers' prior understandings and instructional practices can bring about obstacles because they may have biased knowledge that interferes with their ability to implement a reform in the intended way (Spillane, et al. 2002). Different individuals will also construct various understandings of a reform effort based upon the understandings that they already have (Spillane, et al., 2002). Particularly, messages delivered in a top-down manner can lead to multiple interpretations by all stakeholders. Ultimately, most changes require a fundamental conceptual shift requiring an examination of existing beliefs. Most often, individuals approach new situations by trying to fit them into existing practices in order to comply with what is required (Spillane, et al., 2002). Furthermore, personal experiences oftentimes carry much more weight in decision-making than abstract knowledge (Spillane et al., 2002).

Additional barriers to reform implementation might also be the results of factors outside of the individual. Spillane et al. (2002) extends the notion of teacher sensemaking to include a concept called situated cognition. This idea goes past the sensemaking individual to touch upon the argument that the setting and context of a situation can affect the ability to interpret change (Spillane et al., 2002).

An additional external factor to consider in the obstacles to initiating effective change would be the ambiguity of policy messages (Spillane et al., 2002). For this reason, Spillane et al. (2002) explained that policies initiating change in an incremental fashion were more likely to develop positive responses and implementation. These factors along



with creating a clear message that is easier to interpret may help to create more successful change (Spillane et al., 2002). Former studies on policy implementation fail to account for the role that teacher interpretations and learning have on the success of initiatives (Stein & Coburn, 2008). The process by which teachers come to perceive change initiatives, the perceptions that result, and the way perceptions are carried out in the instructional setting are largely unexplored components of the implementation process (Spillane et al., 2002).

## **Chapter 4**

### **Methodology**

#### **Rationale For and Assumptions of Qualitative Methodology**

Researchers inevitably bring certain beliefs and philosophies with them when conducting research. It is critical to be able to identify them and how they may contribute to the choice of a framework that guides the research. There is a major connection between the philosophy that a researcher brings to a study and the methodological approach that is taken (Creswell, 2013). Along with developing different philosophies, researchers embrace different definitions of reality. The reality that a researcher embraces, in addition to philosophical assumptions, helps to guide him or her toward a specific type of approach to gathering data (Creswell, 2013). In addition to embraced reality, the knowledge that we gain from research depends upon the experiences of individuals in a certain context. Individuals who are a part of a phenomenon have their own viewpoints. Combinations of those subjective viewpoints help to shape the knowledge that we see as being the truth (Creswell, 2013). I believe that the truth found through research is not an objective reality but one that is constructed by individuals involved in specific phenomena. Not only do the viewpoints of participants in a study matter, but the viewpoints of the researcher are also a critical factor when it comes to positioning oneself in the field (Creswell, 2013). Therefore an important message to convey in conducting research under these types of assumptions is that the study will inevitably include biases due to varying backgrounds of researchers (Creswell, 2013).

As a researcher who values the knowledge gained through the subjective experiences of individuals, I have naturally been inclined to utilize qualitative methods

for this particular research. Qualitative research is a situated methodology that allows researchers to position themselves in the real-world (Denzin & Lincoln, 1994). This approach allows researchers to embrace existing assumptions and to utilize theoretical frameworks to guide their inquiry (Creswell, 2013).

I chose qualitative research for this study because I was interested in gathering data pertaining to individuals' experiences through the specific reform effort of a district's differentiation initiative. This type of method allowed for me to be able to best capture individual understandings of this initiative (Auerbach & Silverstein, 2003; Creswell, 2013; Maxwell, 2005; Yin, 2014). Qualitative research also coincides well with my chosen theoretical framework of sensemaking, because the nature of the theory is to capture viewpoints and personal understandings (Coburn, 2005).

### **Strategy of Inquiry**

Along with choosing qualitative research as the appropriate methodological approach, I chose case study design because I wanted to study a specific setting under certain circumstances (Creswell, 2013). A case study approach can be described as a method of research that allows for the exploration of an experience to be revealed and understood (Baxter & Jack, 2008). Yin (2014) states that case study research is done because a researcher seeks to understand a real-world case and that this knowledge will involve essential contextual circumstances relevant to the specific case at hand. I chose the case study method because of the contemporary nature of the differentiation initiative within Winston High School (Meyer, 2001; Yin, 2014). The distinct nature of this change along with how it was embedded within a larger reform effort and how it continued to unfold made the study a prime candidate for case study research.

Within WHS, teachers were involved in a district differentiation goal that was a response to an initial detracking effort. In order to analyze the sense they were making of the goal and how they were implementing the reform in the classroom, I conducted a descriptive case study (Yin, 2014). Yin (2014) suggests that a descriptive case study method is relevant when the questions being sought require an ‘in-depth’ exploration of a particular phenomenon. As a part of my study I sought to provide teacher sensemaking theory as the basis for examining the perceptions held by teachers along with the instructional practices they were employing.

**A closer look at case study methodology.** Yin (2014) refers to a conceptual framework when referencing case study research, yet he does not fully flesh out guidelines to follow in conducting one (Baxter & Jack, 2008; Meyer, 2001). The process of case study research is fluid and allows for the reconstruction of the conceptual framework as relationships become more concrete and more data are collected. Although the framework may be revised, it is critical for there to be some direction and rationale in the beginning of the research (Yin, 2014). Yin (2014) suggests five important components for case study research, which include: research questions, propositions, unit(s) of analysis, reasoning behind the linking of data to propositions, and criteria for interpreting findings. Although there are no specific procedures as to how to conduct case study research, Miles and Huberman (1994) discuss ways in which a case study can be bounded by specific components in order to keep the study confined. The authors suggest beginning the conceptual process by thinking of the major objectives of the case study. Once the objectives are realized, breaking them up into major categories helps the researcher to more appropriately study the relevant issues. In conducting the research, it

was important to specify who and what was being studied in order to make relationships between different variables more connected (Miles & Huberman, 1994).

**Unit of analysis.** One of the major pieces to consider in the beginning of the research design is the unit of analysis, which can be a decision, an organizational change, an event, an entity, a group, or an individual (Yin, 2014). In the case of studying the differentiation reform initiative, the teachers were the unit of analysis (Miles & Huberman, 1994). Examining teacher perceptions of a phenomenon in which varying worldviews are involved can be a complex process. A common mistake made by case study researchers is that the scope of the study becomes too broad (Baxter & Jack, 2008). In this case, I focused on teacher perceptions to ensure the case was bounded.

**Propositions.** In addition to defining a unit of analysis, Yin suggests that identifying propositions within a case study can help to further focus the research (Yin, 2014). Propositions are similar to position statements that help to bind the scope of the study (Yin, 2014). In a review of the literature on detracking, differentiation, and teacher perceptions in the face of large-scale change, I developed several propositions that guided my data collection. The first proposition was that teachers who were apart of the original detracking effort were never given the ability to fundamentally reconstruct their pre-existing knowledge base on how to effectively instruct more heterogeneously grouped students (Spillane et al., 2002). A second and related proposition I developed was that there were most likely attempts made by the teachers to fit new ideas into old routines, when much more fundamental change and collaboration were required in order to successfully teach to such a wide range of students.

My third proposition was that teachers who experienced the detracking initiative, which was implemented in an ineffective way, held more negative feelings about the differentiation initiative due to their prior experiences with reform efforts (Spillane et al., 2002). I initially believed that the sense they made of the differentiation initiative was impacted by the experiences they had with detracking. Additionally, I originally felt that they had let their previous experiences with lower-achieving students interfere with making necessary changes to instructional strategies.

Prior to conducting my research, I hypothesized that the teachers made few if any instructional changes to meet the needs of a more diverse classroom due to the complexity of reform in the realm of differentiation (Tomlinson & Allan, 2000).

Research has shown that if teachers work in environments with few opportunities and incentives to learn about revising their practices, they are less likely to adapt to new initiatives (Spillane, 1999). I also believed prior to the research that although collaborative and professional opportunities were provided for teachers to engage in learning about differentiation, there was not enough time dedicated to focusing on educational philosophies and the basis for the differentiation change (Tomlinson & Allan, 2000).

### **Setting and Participants**

I selected the high school under study because of its 2009 detracking initiative that eliminated most of the general-level courses, which had previously included only the lower achieving students in the school. The lower achieving students were placed into the traditional academic courses, which were previously intended for “middle-level” students. Additionally, a further reform was made to implement a district differentiation

goal to assist the teachers in teaching to more diverse classrooms. The school decided to keep the higher-level honors courses as an alternate track to the academic classes. Since there were different variables that came into play with this particular case, it was essential to organize my research and protocols by way of a case study protocol (see Appendix A) (Yin, 2014). The use of a case study protocol helped to increase the reliability of the study by ensuring that the intended research was carried out as planned (Yin, 2014).

Because I chose case study research, I selected participants according to my judgment and research questions, referred to as “criterion sampling” (Creswell, 2013). Criterion sampling is best used to try to target those individuals who have experienced a particular phenomenon (Creswell, 2013). The criteria that I used for individuals included: being a science or mathematics educator, being a teacher of a heterogeneous academic course, and being an educator at the school for more than two years (when the differentiation goal was implemented). I also included some elements of maximum variation sampling among the criteria I outlined to ensure I was gathering multiple perspectives (Creswell, 2013). Within the participants who met the criteria, I also studied individuals of varying years of experience, those who taught different grade levels, and those who instructed varying subject areas within the fields of mathematics and science.

Before gathering participants for my study, I reached out to the department chairs through email to see which teachers met my criteria. I then reached out to those teachers through email to see if they would be interested in participating in my study. Gathering participants in this way ensured that no one felt any pressure to participate. This method also allowed me to hand pick participants through the criterion sampling method previously discussed (Creswell, 2013). I originally wanted to gather as many willing

participants as possible to allow for data saturation to occur (Creswell, 2013). However, I was only able to bring on eight participants in total because no one else was willing to volunteer for the study.

I was able to fully grasp the phenomenon taking place by gaining access through the school gatekeepers (Creswell, 2013). Important gatekeepers I kept informed were the school's superintendent and Board of Education. I provided these individuals with an overview of my research along with the purpose (see Appendix B) that was approved by the Board of Education (Creswell, 2013; Seidman, 2006). Additionally, I notified the principal, science and mathematics department chairs, and participants, that I was conducting a qualitative case study.

In addition to notifying all important parties, I also needed to consider the relationships I had with faculty members. Seidman (2006) believes it is unwise to interview individuals who are supervised by the researcher due to the power that the researcher may hold over the participants. I was a former teacher and then administrator in the school. Although I was no longer an evaluator within the school, being a former supervisor could have put me in a position of power. Additionally, because I was one of the administrators encouraging the differentiation implementation, I was fearful that teachers would feel pressured to provide positive feedback about it. I accounted for this by ensuring that teachers were aware that their interview was confidential and that I wanted them to be open and honest for the purpose of conducting meaningful research.

### **Data Collection**

A major component of the data collection procedure in case study research involves studying individuals in their real-life situations (Yin, 2014). The choice of data



collection techniques should be guided by the research questions along with the conceptual framework (Meyer, 2001). Three major data collection techniques were utilized throughout my study: interviews, direct observations, and documentation (Yin, 2014). I chose these three methods in order to ensure the triangulation of my findings. Triangulating the data in a research study can help to improve the credibility of the findings (Toma, 2006). The corroboration of my results within the different techniques utilized further added to the trustworthiness of my study (Creswell, 2013; Yin 2014).

**Interviews.** In order to effectively capture the viewpoints of the mathematics and science teachers and the sense they made of the school change, I conducted one-on-one interviews. Interviews seemed to be the best method for capturing teachers' subjective understandings of the academic classes they taught (Seidman, 2006). I utilized Rubin and Rubin's (2012) responsive interview method in order to ensure I was gathering in-depth information about the phenomenon. This method of interviewing suggests for the researcher to begin with conversation-like questions and work to more detailed and specific questions regarding the research (Rubin & Rubin, 2012).

I conducted the interviews with a protocol inclusive of an overview of the case study, the data collection procedures, and interview questions (see Appendix F). The specific interview questions also related to my theoretical framework of sensemaking. Once interviews were completed, I was able to make connections between them and the observations of classroom lessons that were completed.

Within the interviews, I focused my questions on teacher worldview positions and contextual questions in order to determine the sense teachers made of the differentiation initiative (Coburn, 2005). I also asked to have them consider past practices before the

differentiation initiative took place which made the questions more concrete and clear. Furthermore, I had the teachers describe the context of the change effort in order to fully grasp external factors that were considered as a part of their situated cognition (Spillane, et al., 2002).

The first part of the interview focused on individuals' experiences in the field of education. As per my sampling method, I targeted individuals who were present for the original detracking reform effort along with those who were not there for it. For those who were there for the detracking initiative, I asked specific questions about it to determine the sense they made of the change. For those who were not there, I got into detail more about their past experiences before the differentiation reform initiative was implemented. I asked teachers about how the differentiation change was implemented and in what context in order to gain a perspective on the situation (Spillane et al., 2002). The interview also sought to gain insight into the beliefs and attitudes of the participants in relation to educational philosophies.

The second part of the interview focused in on the individuals' perceptions of the state of their academic classrooms and how they were meeting the needs of diverse learners within their classrooms. I asked them to reflect upon past practices in order to determine if instructional changes were made. I also referenced how they continued to make sense of the differentiation initiative. I asked them to make connections between their interpretations of the change initiative and how it was playing out in their classroom instruction. I specifically targeted changes made on part of the teachers to better understand the nature of the initiative that took place within the school.

The meetings were audio-recorded and transcribed and lasted approximately 30 to 60 minutes in length (Creswell, 2013; Seidman, 2006). The interview was structured beforehand by design of an interview protocol (Appendix F), which included the main questions that were asked in addition to possibilities for probing and follow-up questions (Creswell, 2013; Rubin & Rubin, 2012). As a part of case study analysis, it was important to continuously keep an inquiring mind during data collection in order to ask the most relevant questions (Yin, 2014). Additionally, in the beginning of the interviews, teachers were given a consent form (see Appendix C) to sign in order to make them aware of their protections as human subject participants (Creswell, 2013). Throughout the interviews my instincts guided me in asking additional questions in order to clarify or gain more insight (Seidman, 2006).

**Observations.** Direct classroom observations were also a focal point of data collection within the study. The observations lasted approximately 55 minutes in length. I utilized an existing observational protocol, the Reformed Teaching Observation Protocol (RTOP) to guide my analysis of instruction during the observations (see Appendix H) (Sawada et al., 2000). This protocol was used with permission from one of its creators (see Appendix I). I also developed a separate anecdotal protocol, which included the actions that I was looking for as the researcher (see Appendix G) (Creswell, 2013). Within the classrooms, specifically, I was looking at the instructional strategies being implemented and the actions being taken by the teachers toward the students. The specific strategies were then related to differentiated practices.

Teachers of effective differentiated classrooms have found success with a few specific strategies including: providing students with rigorous courses, creating a

personalized learning environment, providing students with academic and social supports, supporting teachers professionally with developmental opportunities and research, focusing students on key skills in learning, and providing an early warning intervention system (Alvarez & Mehan, 2006; Tomlinson & Allan, 2000). Many of these features have links to how the teachers within these schools made sense of the change initiative. It was critical to conduct these observations with an opportunity for follow-up to ensure probing questions were asked about a change in instructional strategies. I was also able to ask teachers about the existence of support for sensemaking throughout the process of this change initiative.

Additionally, I entered the field with the understanding that I brought inevitable bias into my observations, even though I taught both the tracked and detracked courses before (Tjora, 2006). The observations allowed me to further probe and use real-life examples in order to gain more insight from the teachers (Tjora, 2006). I was specifically able ask participants about certain strategies in order to determine changes made to instruction. I was also able to organize and flesh out my observational notes as soon as they were finished to ensure accurate data were recorded (Rossman & Rallis, 2003).

**Documentation.** In addition to direct observations, I gathered documentation to corroborate the evidence provided in the interviews and observations (Yin, 2014). I asked for documentation during the interviews so that participants saw the connection between the questions I asked and the documents I needed. Documentation included the current curriculum of the academic courses, the teachers' professional development plans (PDPs), lesson artifacts, and teacher-provided lesson plans. Within these documents I looked for evidence that linked teachers' sensemaking to their instructional strategies. It

was important to look for certain themes and context clues to determine whether patterns existed among the plans and the observations and interviews.

The new curricular documents contained the following sections: a course abstract, pacing guide, unit titles, unit descriptions, standards, learning goals, learning objectives, formative assessments, summative assessments, performance assessments, major activities and assignments, modifications, accommodations, differentiation, instructional strategies, unit vocabulary, interdisciplinary connections, and resources. The previous curricular documents included: a course description, course level outcomes, course assessments, a pacing guide, standards, modifications, enrichment, and resources. Furthermore, the lesson plan documents contained the following: unit title, learning goal, learning objective, activities, assignments, and assessments. Prior lesson plan documents included: objective, materials, procedures, assessment, and homework.

Although I had planned to mostly use the curricular documents and lesson plans, I realized that these documents had not changed substantially. The content of them had obviously been different because of new standards, however many of the same sections and strategies were present. Because of this observation, I utilized the teacher PDPs and lesson artifacts to a larger extent to triangulate the data.

The information in the PDPs included the major generalized district goals along with the goals that teachers were supposed to personalize to themselves. They also contained a space for teachers to specifically discuss how they would reach each goal. Additionally, there was a section where they listed the resources that were required for them to achieve these goals. The lesson artifacts were specific to the various lessons that were conducted.

In obtaining all of this data, I was hopeful that it would be triangulated and I would be able to link teacher sensemaking to lessons that were modified to be more differentiated. I was also hopeful that there would be clear changes from prior lessons to current ones. While reviewing any documentation it was essential to keep in mind the purposes and intended audiences in order to fully grasp the content of the messages (Yin, 2014).

### **Instrumentation**

**Interviews.** As previously mentioned, interviews were one of my main sources of data collection. I conducted interviews with all chosen participants using a semi-structured format. The interview began with simple conversational questions and worked up to more complex and in-depth ones. Using this as a guide, I was able to have more informal conversation-like discussions with the participants and I developed a certain degree of trust.

In order to focus the interview and develop a foundation, I developed the interview protocol using a *main-branches-of-a-tree* interview structure (see Appendix D). This structure designates certain main questions to be addressed but allows for a degree of probing (Rubin & Rubin, 2012). This format allowed me to target my research questions as the main topics to be addressed. It also provided the opportunity for following up on certain questions to ensure a certain degree of detail was provided (Rubin & Rubin, 2012).

In addition to developing a *main-branches-of-a-tree* interview structure and protocol, I developed a research question matrix diagram to ensure all of my interview questions had relevance (Appendix E). This method allowed me to remain focused on the

research questions. Furthermore, I utilized a teacher from another school district along with a retired teacher from the school district under study to pilot test my interview questions to make sure they were clear and made revisions as necessary.

**Observations.** Along with using an interview protocol, I utilized an established observational protocol. I used the Reformed Teaching Observation Protocol (RTOP) (see Appendix H), which is an observation instrument used as a standardized way to detect the degree of reform in science and mathematics classrooms (Education Development Center, 2014; Piburn & Sawada, 2014). In order to utilize this protocol, I had to go through the specific online training required for using it for research purposes. Although this does not directly relate to differentiated instruction, the theoretical underpinnings of the protocol came from the same as those of differentiation (Piburn & Sawada, 2014). Both the protocol and the philosophy of differentiation have ties to Vygotsky's socio-cultural theory and allowing students to have a voice in their learning process (Piburn & Sawada, 2014).

Furthermore, I developed a two-column observational protocol to take descriptive and anecdotal notes. It was important to be able to capture the essence of the setting by writing down as many descriptive words so that I could relate to the teacher being observed (Glesne, 2006; Rossman & Rallis, 2003). The method I used to observe the teachers was to naively describe their actions by mainly writing down the occurrences I was observing with personal memos in the margins (Tjora, 2006).

**Documentation.** I used the first two parts of RTOP, which were about lesson design and content, to analyze specific lesson artifacts that teachers had developed. I used these to determine the extent to which the content that the teachers were presenting was

reformed. Utilizing the lesson artifacts allowed me to evaluate propositional knowledge and procedural knowledge and also determine the degree of complexity and relationship to real-world application. Additionally, the artifacts helped to provide insight into features of the lesson that I could not necessarily observe but could evaluate utilizing what the students were working on.

In analyzing the lesson artifacts, I coded them utilizing descriptive and “in vivo” coding schemes to determine whether or not patterns existed between them and the observations. Similar to the observation procedures, I took anecdotal and descriptive notes on the two-column observation protocol. I wrote down as many detailed words as possible to ensure I captured the major themes of the documents (Glesne, 2006). As I studied these, I was also looking to see whether or not patterns existed between the plans and the instruction that was observed.

### **Data Analysis**

Following the gathering of data through interviews, direct observations, and documentation collection I began the process of analyzing my data. As each component of data was collected, I was able to transcribe and organize all information so that my memory of the data was more robust. I attempted to analyze at each stage of organizing data as well to make the analysis more manageable. After the recording phase of data gathering was complete, I was able to analyze the results as a whole to determine whether or not patterns existed.

**Data management.** Miles, Huberman, and Saldana (2014) discuss the notion of *data condensation* as a way of eliminating extraneous data to focus on the most important pieces of the findings. They suggest that by condensing the data, researchers make it



stronger by focusing in on the most relevant pieces of information and the knowledge that will tie into emerging patterns (Miles et al., 2014). Before determining patterns, I read over the interview transcripts, documentation, and observation notes again, underlining main points and topics relevant to my research questions (Tjora, 2006, Yin, 2014). I attempted to immerse myself in the data by reading through it numerous times in order to gain a better understanding of my findings (Creswell, 2013, p. 183). I then used different colored highlighters and note cards to organize and distinguish between various main points. I also developed a diagram to note any initial themes and patterns that emerged from the data (Appendix J).

Throughout my analysis, I utilized the theory of sensemaking in order to determine the incremental changes teachers tried to make as a result of the district's differentiation effort. Part of the notion of sensemaking is that teachers try to fit reform efforts into their own worldviews (Coburn, 2005; Spillane et al., 2002). It was essential to analyze the beliefs of the teachers in order to determine patterns that existed. Another major component of how the teachers made sense of the change was through their prior knowledge and connection with the initiative (Coburn, 2005).

Afterwards, I used these overarching ideas to begin the coding process (Saldana, 2009). I focused on two methods of coding schemes: descriptive and "in vivo." The latter presents codes as the actual words of the participant, which are extracted during the beginning coding process and related to the observed parts of the research topic (Saldana, 2009). Descriptive coding somewhat extends upon the participants own words to interpret a key idea (Saldana, 2009; Wolcott, 1994). Once I was able to take out important "in vivo" and descriptive codes, I then grouped the main points under headings that were

related to one another (Ryan & Bernard, 2003; Saldana, 2009). My initial grouping was placed within a preliminary code book which allowed me to clearly look at relationships and patterns (Appendix J). Once the patterns were categorized and further analyzed, I was able to construct overarching themes related to my research questions (Appendix K) (Creswell, 2013).

As a part of my first research question, I was looking for worldviews and contextual factors related to the sense teachers made of the differentiation change effort. Spillane et al. (2002) and Coburn (2005) suggest that certain factors surrounding initiatives, other than the individual, can have a critical impact on the reform. It was important to look for patterns among teacher interview answers related to the sense they made of the differentiation initiative in order to grasp how they perceived the change. It was also critical to look for themes that may have existed between certain interview answers on certain contextual factors and the sense that was made of the initiative to see if there were important relationships discovered.

In order to address my second research question, I specifically targeted teachers who had prior experiences with the original detracking effort. It was important to determine the sense that they made of the differentiation initiative to see if it differed from those who did not experience the detracking reform. I then looked more closely at the sense that was made between those who experienced the detracking initiative and those who did not to determine the degree to which the themes were different or similar.

For the third research question, I was looking at instructional strategies, utilizing the RTOP tool, and comparing them to the sense that teachers made of the differentiation initiative interpreted through the interviewing process. I scored the RTOP by averaging

all of the scores together. The scores for each component ranged from a zero to a five. I classified low RTOP scores as falling below the score of a two and high scores as above the score of a two. I focused on patterns that connected certain themes of sensemaking to patterns of instructional strategies. As I tried to answer this research question, I needed to analyze all of the sources of data at once to determine emerging patterns. It was also beneficial to determine if themes existed between various worldviews and how teachers were implementing differentiation in their classroom.

Furthermore, I targeted differences in past lessons versus current lessons in order to determine changes made in the new setting. Coburn (2005) and Spillane et al. (2000) argue that many teachers take reform efforts and fit them into pre-existing cognitive frames in order to try to interpret change. They also argue that unless teachers are given appropriate collaborative measures and professional development, they are likely to adapt policies to fit their own agendas and beliefs about the classroom. The comparison to previous lessons helped to provide insight on the effect that this district initiative had on the teachers' current practices.

**The coding process.** In order to properly analyze data, it was important to ensure proper strategies were planned for in order to find themes that existed. As previously stated, I used descriptive and "in vivo" methods to code (Ryan & Bernard, 2003; Saldana, 2009). As a part of the coding process, I first looked to code for patterns in the worldviews, experiences, and contextual factors in which the reform was implemented. Because beliefs, knowledge, experiences, situations, and social contexts influence how individuals come to understand and make sense of policy (Spillane, 1999), I sought to find patterns in commonalities that existed among individuals in these areas and specific

instructional strategies that were implemented in the classroom. I then grouped these together to compare contextual factors to sensemaking, along with looking for commonalities and differences between those who experienced the original detracking initiative and those who did not (Coburn, 2005). In order to connect sensemaking and instructional strategies, I looked for key phrases that linked teacher implementation techniques to ways in which they perceived the differentiation initiative. I then moved on to more abstract levels of coding by comparing interview patterns to those patterns identified in observations within the classroom.

The propositions of my research included how sensemaking played a factor in how changes to instruction had been implemented since the differentiation reform initiative was implemented. Various research findings from Coburn (2005) and Spillane et al. (2002) were used to guide the research questions I put forth to connect teacher beliefs, experiences, situations, experiences, and social contexts to the interpretation of the change. As provided in the interview protocol, these topics were addressed in the questions asked of teachers. The answers provided were then used to analyze patterns that connected instructional strategies that took place to certain sensemaking themes.

As a part of my case-study research I then utilized “explanation building” in order to explain a phenomenon based on my presumed set of beliefs about the connections that existed between the theory I was delineating and the features I was studying (Yin, 2014). It was essential to make connections between the answers provided and the themes related to the theory of teacher sensemaking. This process allowed me to be able to provide a detailed rationale explaining how instructional strategies were linked to teacher sensemaking.

## **Naturalistic Generalizations**

Information gained from my study cannot be generalized to other school districts due to the specific contextual factors present within this particular case. However, certain generalizations were developed that can aid various other school districts dealing with similar issues. Schools that hope to develop new goals or professional development might use this study to build stronger learning opportunities for teachers based upon results of how sensemaking is linked to instruction in the classroom. More specifically, districts choosing to implement any type of detracking reform or undertake elements of differentiated instruction might use the data to develop more effective professional development that will target reformed instructional strategies.

As a result of this study, I have developed more targeted differentiated instruction professional development workshops to focus on elements with which teachers struggle the most. I also created a round-table at my school to facilitate discussions about how to effectively meet the needs of diverse groups of learners. Because sensemaking can be impacted in large part by social context, I believe this may assist in ensuring that although teachers may at first make different sense of reform, they will be able to come together with an administrator to discuss a “shared” vision of differentiation.

## **Trustworthiness**

Qualitative research is a holistic form of methodology in that it focuses more on contextual factors and processes than results and comparisons (Toma, 2006). With this type of methodology, as with all other forms of research, it was important to establish the rigor addressed in my approach to collecting and analyzing data (Toma, 2006). The formulation of data credibility checks allows researchers to protect their data (Lather,

1986). It was important to adhere to rigorous standards in order to establish credibility within my study (Creswell, 2008; Toma, 2006). Triangulation, similar to structural corroboration, was established by using the different data collection sources (interviews, observations, and documentation collection) as ways to corroborate my findings (Creswell, 2013).

I established authenticity by gathering data from numerous teachers (Creswell, 2013). Additionally, checking statements within interviews and observations against the provided documentation allowed for further triangulation among participants (Ryan & Bernard, 2003). As themes emerged, I tried to establish credibility by utilizing member-checking. Finally, I was able to establish confirmability by participating in a peer review, engaging in conversations with my fellow colleagues in education, and by acknowledging my biases as a researcher (Toma, 2006).

**Credibility.** In qualitative research credibility is about ensuring that the descriptions given by participants are being accurately portrayed in the findings. It is important to ensure that participants' words are being represented as they intended for them to be interpreted. In a case study, the entire premise of the research is to ensure an accurate story is being told, thus credibility is essential.

In order to ensure credibility is being maintained throughout a study, it is important for the researcher to have a strong familiarity with the case and contextual factors, maintain a sense of awareness of emerging themes, have strong theoretical interests, and assume a well-rounded approach (Toma, 2006). Because I was a former teacher and administrator of the school under study, I had a strong understanding of the

school and the situation under study. This assisted in my ability to become familiar with the setting and variables.

In addition to my disposition as a researcher within the field, it was also important to develop strategies that ensured the data were credible. As a primary focus, I established triangulation of the data by studying the interviews, observations, and documents to ensure findings were accurate and could be reflected among the sources. Additionally, it was critical to incorporate member checking to ensure my findings were interpreted accurately (Toma, 2006). I established a procedure for member checking with participants by asking them if I could reach them at a later date to confirm some of my initial findings. It was important to member check at various points to further move the study along.

**Transferability.** Although less important than credibility, transferability has an important place in qualitative research. In case study research, in particular, it is important that findings are able to be used by others with similar contextual factors (Toma, 2006). Along the same lines, it is important to explicitly highlight the work of others to ensure transferability is inherent in the study. Using specific terminology can help to strengthen the trustworthiness of the study. Furthermore, utilizing multiple sources of data, multiple participants, and varying forms of data collection strategies can further enhance transferability.

As a part of my research, I have identified that these findings, although not generalizable to all school settings, can be used in those with similar reform efforts and contextual factors. Schools implementing any form of differentiated initiatives or detracking reform efforts among staff members may be able to use the data to incorporate

more effective change by accounting for specific sensemaking strategies enacted by the teachers. I also ensured that I highlighted specific patterns that were evident across various sources of data to make sure that transferability was more explicit.

**Dependability.** While transferability is important when it comes to generalizing components of qualitative research to other studies, dependability can ensure that necessary changes in the research design are addressed (Toma, 2006). This is important because the field of research is not a laboratory setting and must be studied in a real-world context. This also makes the openness of the researcher all the more critical if changes are made to the research design. Items such as addressing biases, discussing ethical dilemmas, and searches for alternative explanations play a critical role in ensuring a study has dependability (Toma, 2006).

In this particular case study, I addressed bias by discussing my role as the researcher and any biases I had toward the reform initiative. I was also open in my findings in which I had preconceived notions about. I was also able to keep a running list of alternative explanations or interpretations and continued to member check as previously stated to make sure that I was not validating my own assumptions. I also consulted with other educational experts to ensure my findings were agreeable with the observable data. Once again, triangulation of the data helped to demonstrate dependability by interpreting multiple sources to check for similar themes and patterns.

**Confirmability.** Along the same lines of checking to ensure the data are interpreted without bias, comes the idea that the data should also be confirmed by someone other than the researcher. This process is referred to as confirmability. Similar to objectivity in the quantitative realm, confirmability seeks to ensure participants' ideas



are reflected in the findings and not inclusive of biases on part of the researcher (Toma, 2006). It is essential that the findings be more representative of the participants than the researcher (Toma, 2006). One such way to do this is through member checking (Miles et al., 2014).

Another method I employed was to utilize my objective notes during the interviews and observations to come to conclusions rather than coming to conclusions as I conducted the data collection (Toma, 2006). Finally, I had an educational expert to consult with to play “devil’s advocate” to ensure I was interpreting the objective findings I came up with in the best way that represented the participants I was studying (Toma, 2006). Although I tried to remain objective as I conducted my research, it was difficult to not formulate predisposed ideas about differentiation and detracking reform since I had taught both tracked and detracked classes. One method that helped me to step back was to focus on my research questions. Saldana (2009) suggests having them laid out during the course of the observation in order to maintain focus.

In addition to establishing trustworthiness by ensuring credibility, transferability, dependability, and confirmability, it was essential to develop valid procedures that were specific to case study research. Yin (2014) discusses four tests that are commonly used with case studies to establish quality research. These four tests include: construct validity, internal validity, external validity, and reliability. In order to avoid my own subjective biases in this research, I ensured construct validity by using multiple sources of data including interviews, observations, and documentation. Additionally, I established a chain of evidence by directly linking the research questions I posed to specific quotes

used by participants. Furthermore, I had my findings read by participants to ensure their words were presented in a valid way.

In order to make sure I was creating internal validity, I addressed rival explanations that needed to be included when finding patterns between teacher sensemaking and implementation of certain practices. I was sure to consider all variables impacting teacher implementation of certain practices within the classroom. Additionally, I tried to be proactive in developing my interview protocol by eliminating questions that were interpreted as inferences.

Furthermore, to address external validity, I carefully crafted my research questions to ensure generalizations could be made beyond the specific case under study (Yin, 2014). The questions referred to the theory of teacher sensemaking in addition to a school-wide district reform effort which can be transferred to various other educational institutions. Furthermore, the research questions were originally crafted to answer the “how” and “why” questions pertaining to sensemaking and implementation of differentiated instruction (Yin, 2014).

Lastly, in order to establish reliability, I was able to employ various strategies that minimized bias and errors that came into play while conducting research (Yin, 2014). One method that ensured reliability, specific to case study research, was the creation of a case study protocol (see Appendix A). Another previously mentioned method that was employed was member-checking. Allowing another colleague to review the data and findings helped to determine if he or she came to similar conclusions. This was completed with all three sources of data.

## **Role of the Researcher**

In this research study, I took on a constructivist perspective in which I considered the importance of human subjectivity but did not rule out the notion of an objective reality (Baxter & Jack, 2008). In acknowledging the existence of subjectivity in research, it is also important to point out biases (Miles et al., 2014). One method for eliminating bias and ensuring the data presented are trustworthy is to open oneself up to biases that exist (Miles et al., 2014). I played a role in the reform effort to eliminate the general level courses and bring in the differentiation initiative within the high school under study. My beliefs about the perceptions that individuals held about change and the way in which they went about understanding it, caused me to want to study the teachers as my unit of analysis. I tried to remain an objective researcher but realized that my position would undoubtedly be biased. In case study research, the observer can take on a variety of epistemological orientations in the quest to uncover truths about phenomena (Yin 2014).

As a former educator I had direct experiences with both detracked and tracked courses along with differentiation. I held negative perceptions of courses with lower performing students and positive perceptions of those with higher performing students simply because of the many disciplinary issues that arose in the general classes. When the school I was teaching at decided to eliminate the general-level courses, I had positive experiences with students in these new heterogeneous classes. I felt as though students were more confident while holding themselves accountable to higher expectations. I did not see the change as a negative one like most of my colleagues perceived the original 2009 detracking initiative. Additionally, I did not see the subsequent differentiation goal, implemented in 2014, as a negative one either.

In general, I have typically been open to change within my profession if I am aware of the benefits of the initiative and have time to collaborate and learn about it. I acknowledge that as an educator, I did not always enact changes that I did not understand. For instance, when our school first adopted a new teacher evaluation tool, I was very skeptical about it and resistant to making changes within my classroom because I did not understand the importance or purpose. However, as I learned more about it, examined research on my own, and discussed the initiative with colleagues, I bought into it and started to use it. These experiences have made me connect more with Coburn's (2005) theory of teacher sensemaking along with other researchers who have contributed largely to this research (Spillane et al., 2002). In the case of eliminating the general level courses, I understood the importance of decreasing the achievement gap and felt as though I had a say in the change initiative. I believe that I was also among those who did not make necessary adjustments to these new courses to aid struggling learners in a more heterogeneous setting.

After being a teacher during the time when the general-level courses were eliminated, I then became an administrator during the time when the subsequent differentiation goal was implemented. One of the first goals in my new administrative position was to work with the administrative team to help to close the gaps that existed among the various subpopulations within our school. As a team, we felt that a goal of differentiation was an answer to many problems that existed and a solution to helping struggling teachers.

Although well-intentioned, the first time the differentiation goal was introduced, it was not fully conceptualized by the administration. It originally seemed to lead to a lot of

confusion on part of the staff. I do feel as though the second year, after gathering common definitions and allowing staff to have an element of choice in the change, there were much more positive feelings about it. As an administrator, I believe that anytime accountability measures are introduced though, negative reactions come about. At the beginning of the research phase, I believed that the teachers would have negative interpretations of the differentiation goal in the initial year it was implemented and more positive feelings about it during the second year.

In December of 2015, I left the district to move to another school as an administrator in a similar role. Although I am no longer a supervisor at the school under study, it is important to consider that because I was one of the administrators behind the goal, teachers may have felt as though they were offending me if they discussed the goal in a negative light. This made my goal of being open and treating the interviews as a conversation all the more important. Furthermore, as a former administrator, I used to have formal authority over those I interviewed and observed. I do not believe that this was a concern because the research I conducted had no impact on teacher evaluation or job security since I moved to a different school district.

**Goals as a researcher.** Although I had preconceived notions about educational change efforts and the negativity that comes with them, I was interested in understanding how the WHS science and mathematics teachers made sense of this differentiation initiative and how they adapted their instruction as a result. While I am no longer an employee within the school, I still believe that the general-level courses were not preparing the students to be successful and I do not wish for them to be brought back in to the school schedule. I do believe that teachers may need more assistance in setting up a

classroom environment more conducive to a heterogeneous setting. Looking at this reform effort from an outside perspective allowed me to see a very unique perspective on the findings.

Conducting research on teacher perceptions of heterogeneous courses in mathematics and science was new for me but I was involved in prior studies in the realm of ethnography including exploring teacher perceptions of cooperative learning in science. Additionally, my past studies using action research have included investigating the topic of gender-bias in science education. The research on cooperative learning in science classrooms has links to gender bias in these classes in that they suggest a positive relationship between group-learning and increasing female interest within scientific fields (Herreid, 1998). Additionally, the strategy was found to bring about positive learning potentials for students with varying ethnic backgrounds along with those having diverse learning and behavioral needs (Herreid, 1998; Wood, 2009).

### **Ethical Considerations**

In addition to considering my role in the research and being open toward biases that may exist, it was critical to address ethical considerations to ensure participants were treated fairly and data were gathered accurately. There existed numerous places for ethical considerations within the methodological framework. The first place ethics was considered was in determining the purpose of the study and the reason for which it was being conducted (Kvale, 2007). If there is no benefit to a group outside of investigating scientific knowledge then the research should be reevaluated. In my study, I sought to determine the sense that teachers made of a differentiation initiative in order to be able to effectively target more appropriate professional development in the future along with

helping other districts that seek to implement similar reform efforts. Other major ethical areas considered were the interactions taking place with participants. It was essential to protect the privacy of my participants and to maintain a trusting relationship with them (Creswell, 2013). I was open about any hesitations I experienced and provided teachers with ample opportunities to opt out of the study.

Other considerations I made when designing and carrying out the data collection process were to ensure I made the purpose of my research clear to participants and to acquire informed consent. In my research this was accomplished by presenting participants with an informed consent document (Appendix C) along with explaining the purpose of my research, and providing a brief overview. Furthermore, I made it explicit that participation in the research was voluntary and that participants had the right to opt out at any time. Researchers should always take into consideration the stress endured during the interview process, especially on part of the participant who may feel inferior to the researcher (Kvale, 2007).

Along the same lines, the confidentiality of the interviewees should not be breached during collection, analysis, and reporting (Kvale, 2007). All efforts to secure the data were made so as to protect the subjects (Kvale, 2007). As I input data into protocols and then coded the data into organized tables afterwards, I provided each participant with a code name. The code name key was then stored in a locked filing cabinet on a hand-written piece of paper. The document was then destroyed afterwards so as to maintain the confidentiality of my participants.

**Conclusion.** As previously mentioned, a qualitative case study approach allows a researcher to study a phenomenon within a particular context (Baxter & Jack, 2008). By

applying the methods discussed in this section, I was able to present the findings through a well-rounded perspective inclusive of all voices (Baxter & Jack, 2008). Through the words of the participants I was better able to explain the particulars behind the differentiation initiative recently enacted as a result of an original detracking reform effort. As a result of my findings, I can now better understand differentiation and detracking reform through the lens of sensemaking. By employing ethical practices and tactics associated with trustworthiness throughout the study, I feel as though my findings were accurate and honest.



## **Chapter 5**

### **Findings**

In this section, I present my findings. First, I will revisit my questions and provide a brief overview of my findings. Then, I will discuss each of my participants and include key points they made that contributed to the context and research of the study. Next, I will discuss patterns that emerged in addition to the connections made to sensemaking and the literature behind my research. I began my study with the following questions:

1. How do individual worldviews, experiences, and contextual factors impact the sense that teachers are making of the district differentiation goal?
2. How do individual experiences with detracking, in particular, impact the sense that teachers are making of differentiation?
3. How does sensemaking relate to the reformed differentiated methods of instruction enacted by the teacher within the classroom?

These questions were designed to understand how the math and science teachers were not only making sense of the district's differentiation goal but how it was being implemented within their classrooms. Additionally, since the school's lowest level of courses called the "general" courses had been eliminated, the idea of studying the change initiative and how it related to this additional detracking reform made the study all the more unique in nature.

It is important to begin this section by discussing the overall finding that the differentiation goal, although well-intentioned, did little to initiate reformed teaching at Winston High School. As a result of the goal, the teachers resorted to implementing strategies provided by the district's professional development opportunities. Although the

strategies were categorized as differentiated, they did not initiate the more fundamental change required of classroom instruction that was being sought after when the state implemented the new graduation requirements.

In addressing the first research question, I was able to connect various factors including: experiences, background, and context to how the teachers made sense of the differentiation goal. During the first year of implementation it was evident that most educators struggled with various contextual factors. These factors included: the number and scope of district initiatives, the clarity of the goal, the time and support provided, the professional development available, and socialization factors. Teachers seemed to feel overwhelmed by the number of other district initiatives taking place at the same time along with not having enough time to plan for differentiated activities. Furthermore, teachers were unclear as to what the differentiation goal meant and what was expected.

Other influences on the sense that teachers made of the differentiation goal were professional learning and socialization factors. These two patterns of evidence also seemed to impact the feelings that the teachers had about the goal, whether they were positive or negative. Those teachers who had negative professional learning experiences struggled more with acceptance of the goal. Whereas those who had positive experiences seemed to accept the goal. The same was true for socializing with peers. Teachers who had more positive conversations felt more positive about the goal while those who had negative conversations felt more negative about the goal. Feelings also did not seem to exhibit a relationship with reformed teaching strategies.

In addition to contextual factors impacting the sense that was made, was the educator's presence during the time when the school detracked its lowest level classes,

which addresses my second research question. Educators who were present in the school when the detracking initiative was implemented had similar experiences as one another with the former general classes. However, they differed in their opinions as to whether or not the courses should be brought back. The teacher who was exhibiting reformed teaching techniques that were found not to be a result of the differentiation goal, was having more success in her classroom with the DI strategies she was implementing and therefore did not want to bring back the general level courses. Both felt appreciative of the support offered by the district for differentiation along with the continuation of the goal; however this feeling did not equate to reformed techniques resulting from the implemented goal.

Of all the teachers, those present and not present for the detracking initiative, the teachers implementing the most effective strategies had engaged in prior professional learning experiences that fundamentally changed the way they thought about student learning and assessing. Three of these teachers were a part of the same professional learning community. This addresses my third and final research question which connected sensemaking to implementation. Teachers who seemed as though they made sense of the differentiation initiative easily were not necessarily ones who demonstrated reformed teaching methods according to the RTOP observation protocol. Many of the examples discussed were procedural and aimed towards compliance rather than effectiveness. Although these teachers seemed to internalize the goal, the practices implemented fit in more with their previous, more traditional practices.

Finally, teacher values and the sense that was made of the goal impacted the implementation of the goal in the classroom in varying ways. The way teachers defined

how students learned best seemed to connect with how they defined differentiation. For many teachers, this also played out not only in the examples they provided on how they differentiated but also in the observations that were conducted. The separation between the low and high scorers was demonstrated in the complexity of details provided in their definitions and descriptions. Higher scorers gave more detailed and complex answers in their descriptions of how students learned best in addition to their differentiation definitions and examples. Additionally, high scorers also described the purpose of education in the realm of the individual student rather than in the context of society or a group.

### **Participants: An Introduction**

I was able to collect data from four science teachers and four math teachers, each with different backgrounds and experiences. Although the participants told different stories and had varying experiences, patterns emerged from the various things that they shared. In this section, I present a brief background of the participants, sometimes using their own words to bring forth some of the key ideas they expressed. I felt that this would be important in understanding some of the backgrounds of the teachers and various contextual factors that may have influenced their sensemaking and implementation of the reform effort.

**Ms. Michelle Campbell.** *I migrated to the idea that I need to use my subject area as a vehicle to teach students how to problem solve mainly...and not just problem solve in a literal sense with this calculation or that calculation but to approach something that they've never seen before and figure out how they are going to take it apart, work through something to try and get that grit and get away from that fixed mindset and more*

*into a growth mindset. It's not so much about the struggle as it is about the perseverance and showing that you have the emotional fortitude to work through something. Many times, unfortunately the message that these students tend to pick up is that if they don't get something as fast as their peers or if they struggle with something, they are stupid or they are dumb and that they can never get it. That's the message they internalize so I've actually had explicit conversations with them that they are going to struggle and that it's okay.*

Ms. Campbell has been a teacher for over fifteen years. She has taught many different levels of science over the years, including ESL students and children with severe cognitive impairments and has gathered many different skills and strategies throughout her time in education. Ms. Campbell believes that she uses her subject area to teach students how to become more critical problem solvers.

**Ms. Lauren Dantini.** *I was fine with the differentiation goal. We had talked in my undergrad a lot about differentiated instruction so all of this was stuff that I was already familiar with. It wasn't brand new for me.*

Ms. Dantini has been a teacher for over five years. She has mostly taught the Academic level of students. Ms. Dantini is involved in many after school extra-curricular activities. When asked how she thought students learned best, she replied "I think it depends on who they are." Although Ms. Dantini was not teaching in the school when the general level courses were eliminated, she has had limited prior experiences with tracked courses through student teaching.

**Ms. Beth Dickerson.** *I believe that every student should be challenged but different students have different levels of challenge. And there are some students who just can't do some things and that should be okay too.*

Ms. Dickerson has been teaching at Winston for less than five years. As a teacher in the district, she has taught mainly Academic level courses. She believes that students learn best when “they’re engaged, when they’re comfortable, and when they’re not afraid.” Ms. Dickerson was not present when the school eliminated the general level courses and she stated that she had no idea why they were eliminated.

**Ms. Nicole Dilks.** *I’m very concerned and I know that there’s a few of us that are concerned that lower level classes are not offered. I think it puts a lot of stress on my students that maybe they can’t handle the material in the Academic classroom. They are not going to go to college. They know they’re not going to go. However, that doesn’t mean they’re not valuable as individuals. I’m concerned that the lack of general level courses is presenting a need now that we are not filling.*

Ms. Dilks has been a math teacher for over ten years. In her years as a teacher in both the public and private settings, she has taught a variety of math courses at varying levels. Ms. Dilks was teaching at the school when the general level courses were eliminated.

**Mr. Robert Downey.** *It’s really what we have been doing already...I feel like many other people in the teaching community were so worried like ‘I’ve got to re-learn what differentiation is’ and I’m like ‘no it’s what you’ve been doing.’*

Mr. Downey has been teaching at the school for less than five years. In those years, he has taught a number of different levels of math. Mr. Downey believes that the

best way for students to learn is “to give them accessibility to the knowledge.” He was not present in the school when the general level courses were eliminated.

**Mr. Sean Marcus.** *I say to the students, ‘Have you ever failed a class since you’ve been in school?’ And they all are like ‘no I never failed a class’ so then you’re going to be fine. You know I didn’t fail a class in high school and things were hard and you think I’ve never failed completely, so you’re going to be able to do it. For some students being wrong is a constant panic.*

Mr. Marcus has been a teacher for over three years. He has taught many levels of science including higher level and academic courses. Mr. Marcus is also involved in many extra-curricular activities. During the time period when the general level courses were eliminated from the school, Mr. Marcus was not teaching yet.

**Ms. Kelly Masters.** *I didn’t even know there were differentiated learning styles until college. So when I learned that, I remember that hit me hard and I kind of carried it with me and it became one of the biggest things that I focused on. I think I got this idea in my head that if I taught only one way, I would be an ineffective teacher.*

Ms. Masters has been a teacher for less than five years. She has mainly taught the Academic level students but has also taught Academic lab classes for students who failed math the previous year. This course offers additional class time for students to work on skills that will help them to be more successful in math. Although Ms. Masters never taught a general level course at Winston, she had past experiences with them as a student herself.

**Ms. Sara Sharp.** *At the end of their four years, they should be set-up for success in whatever that is. Whether that’s if the kids want to go to college and be an engineer*

*then we should set them up for that. But if they are going to be, you know a mechanic, I want them to be the best mechanic they can be and I'm not sure the current set-up helps every student achieve the best that they can do at their level. Like we all want all of our students to be food scientists but we don't want them to be chefs... We only cater to the intellectual ones.*

Ms. Sharp has been a teacher for over five years and has also taught varying levels of courses in science. She never taught general level courses because the detracking initiative occurred before she was hired. She has also taught the highest level of science through her Advanced Placement courses.

### **Factors that Influenced Teacher Sensemaking**

In the realm of sensemaking, the interpretation of a policy is established by connecting an implementing agent's existing cognition with their situation and policy signals (Coburn, 2001; Spillane et al., 2002). The way that someone interprets change results from the interactions between these three components. The first component examined as a part of my first research question was that of each individual teacher's cognition on the topic of the differentiation goal. In analyzing the individual sensemaking process, it was important to consider how this new stimuli was impacted by prior understandings, knowledge, and experiences (Coburn, 2001; Spillane et al., 2002). Furthermore, another major component of the sensemaking process that was examined, in addition to individual cognition, was that of situated cognition. Situated cognition takes into account the setting in which reforms take place and how that impacts individual thought processing (Coburn, 2001; Spillane et al., 2002).



During my analysis of data, several factors emerged that influenced teacher sensemaking. These factors included: the number and scope of district initiatives, the clarity of the goal, the time and support provided, the professional development offered, and socialization factors. When individuals make sense of changes, cognition is impacted by the working conditions that exist. Working conditions can either help or harm the sensemaking process and the way in which it is interpreted and thus carried out (Spillane et al., 2002). In the section below I will describe the themes and patterns that emerged related to my first research question.

**Number and scope of district initiatives.** The first pattern to emerge was that there were a large number of other new initiatives taking place at the same time that the differentiation goal was introduced. As a result of this, many of the teachers felt overwhelmed. Ms. Campbell discussed her feelings:

I remember at the time being overwhelmed by Marzano, by SGOs, by DI, by SMART, by all of the initiatives. I can't say that I had any deep thoughts about the differentiated learning goal other than 'okay that's what it is, I'll get through this year and figure it out next year.'

Ms. Campbell seemed to be struggling with trying to effectively implement differentiated instructional strategies at the same time as learning the new curriculum that was created because of revised state standards in addition to adapting to various other changes.

Other teachers also commented on a sense of the staff feeling overwhelmed. In discussing the various other initiatives taking place at the time, Mr. Marcus commented: "I think other teachers felt severely overwhelmed." Mr. Marcus also felt as though he was not as stressed as others due to his college learning experiences with DI.

Another teacher who commented on a similar feeling was Ms. Dickerson. She spoke about the many initiatives from that year in addition to having been a newer teacher. She stated:

As a newer teacher who doesn't know any better, it overwhelmed me but I wasn't as annoyed as the teachers who've been teaching for twenty years and they have all of these things thrown at them that they've never had to do before, so that's also part of it I guess.

Her thoughts offered a unique perspective into the situation as she had been a newer teacher when this reform was introduced.

Not only did the teachers speak of being overwhelmed by the district initiatives, but they also had to plan for and take action on five individual goals within their Professional Development Plans (PDPs). The first PDP goal required teachers to create common assessments for their subject areas. The goal read:

From July 1, 2014 through June 30, 2015, teachers will effectively implement *formative and summative assessments*; analyze these multiple measures of *student achievement data* (i.e. common assessments, model assessments, MAP, etc.); and engage in collaborative discussions that inform instruction to increase student performance.

Teachers were expected to create these assessments, implement them, analyze them, and take action on them within their PLC time. There was also no additional common planning time for teachers to engage in this process.

The second PDP goal required teachers to integrate the new CCSS and technology into their lesson plans. The goal stated:

From July 1, 2014 through June 30, 2015, all teachers will continue to integrate the *Common Core State Standards (CCSS)* and technology into lesson plans directly or in a cross-curricular fashion to increase depth and rigor so that students are prepared for implementation of the PARCC assessments in the spring.

As a part of this goal, teachers not only had to learn the new standards, but also had to reconstruct the lessons they were delivering to reach deeper depths of learning.

The third goal was the differentiation goal, which was the primary focus of this study. As previously mentioned, it read:

From July 1, 2014 through June 30, 2015, teachers will be able to choose appropriate *differentiated instructional methods and learning activities* (i.e. Universal Design for Learning) to address the unique and diverse academic needs of students through effective and appropriate implementation.

As with the other goals, teachers were not given additional time to implement this effectively.

The final two PDP goals were made to be more personal but also related to a new teacher evaluation system that was put into place only a year prior, the Marzano Teaching Framework. The goal read:

Choose 2-3 elements from the Marzano Teaching Framework (Domain 1) for which you would like to focus on improving during the 14-15 school year.

Teachers needed to find two components of the new evaluation system to improve upon for that school year.

Having such a large number of goals to focus on for the year seemed to be a major contextual factor in this situation that caused teachers to feel overwhelmed with the

differentiation goal. The following year, the same goals were kept for the teachers to continue to focus on. One minor change made was that rather than having to select from 2-3 elements from the Marzano framework to improve upon, they only had to choose 1-2. Teachers stated they were not as overwhelmed as they were during the first year. However, it is unclear whether the reduced number of goals, the year of experience with all of the initiatives, and/or some other factor reduced the sense of being overwhelmed.

In addition to the large number of goals being implemented, the scope of each individual goal was extremely wide. For instance, having the teachers create district-wide summative assessments that would be considered valid and reliable, was a large undertaking. Furthermore, having teachers integrate brand new standards into their lessons involved not only integration but also a deeper understanding of the concepts and skills present within each standard. For the following year even though the goals were reduced by one, the scope of each goal was still very large.

**Clarity of goals.** In addition to there being a large number of complex goals to focus on at once, the clarity of the differentiation goal came into question by many individuals. Researchers believe that a large part of the sensemaking process is about how individuals interpret the messages that are given to them. As a part of my interview questions, I wanted to ensure that I was able to gather how the teachers first interpreted the differentiation goal. The first emerging pattern that was discovered amongst the teacher responses was that in the first year of the differentiation initiative, there was not a clear definition provided. Some also argued that they did not know what the goal meant for their specific subject-areas. For some this translated into the freedom to try new activities but for most it was challenging.

Ms. Campbell discussed how she was initially confused by the original differentiation goal. In discussing a meeting that she had been at with other teachers, she described the conversation about the differentiation goal: “One of the things that came out of this meeting was that nobody knew what the first goal meant.” This was one of the factors that made Ms. Campbell feel unsure of the goal in the first year of initiation. She admitted that in that very first year she had thought it was just another “educational reform trend” that would go away the following school year.

Ms. Sharp had major concerns with there being no definition provided for differentiation along with the lack of examples that would be fitting for differentiation in her specific subject-area:

I just want to see, especially what kinds of things they recommend an upper level science teacher do. Like tell me what you want me to do and I’ll do it. Like just to say differentiated instruction, it’s just so open-ended. I haven’t even heard a concrete definition yet or seen an example given to us by the people who are telling us to do it.

Ms. Sharp seemed to be experiencing frustration with not knowing specific examples of differentiated instruction in the realm of her subject-area. Additionally, she stated that the definition she learned about differentiation in college was at odds with how the school was laying the goal out. She stated:

I feel like the stuff I learned about differentiated instruction in college is different than how it’s implemented here because it used to be...honestly I don’t really remember too much but I feel like in college, differentiation was more: you want to teach in a variety of ways throughout the year so that you’re reaching all of the

kids. You want to make sure that you do some visual things, some hands-on things...

Since sensemaking relies heavily on prior knowledge, introducing a new term to teachers with new expectations can often spark feelings of frustration as the reform is initiated especially when they associate that term with a different meaning.

Various other teachers also brought up the lack of examples but did not feel as frustrated as Ms. Sharp. Mr. Marcus spoke about the conversations that took place around the DI initiative and commented:

A lot of people were wondering ‘I do this, does this count as DI? Does this count?’ So there were a lot of conversations with other groups of teachers about what each group was doing and does it count. That was kind of what everybody wanted to know: ‘Does this count as DI?’

Mr. Marcus had already seemed to have a wealth of knowledge on differentiated instruction through his college experiences. Having this knowledge, may have made the new goal seem not as foreign to him.

Ms. Dilks took the goal as an opportunity to try out some new activities. When asked how she interpreted the goal, rather than discussing any confusion over its meaning, she stated:

I thought what I was required to do was to come up with different activities that would reach different learning styles in the classroom. So instead of always giving notes, giving class examples, giving homework, we tried different techniques that year. We tried jigsaw, we tried choice menus, we played Kahoot games...

As is the case with sensemaking, Ms. Dilks seemed to have interpreted the reform to mean adding various activities into her classroom without fundamentally changing some of her existing beliefs about learning.

**Time and support.** In addition to the goal being unclear in its initial implementation, another contextual factor that was consistently brought up was “time.” In asking the teachers which parts of differentiation they struggled with, Ms. Dantini replied “Any of them that take time are the ones I struggle with.” In being probed further and asked whether or not she meant class time, she clarified: “The ones that take a lot of prep time are the ones I struggle with.” Ms. Dantini also did not write out her differentiated activities in her lesson plans. She commented again: “no time.” She seemed to want to be able to do more with differentiated instruction but felt limited, especially with her involvement in such a large amount of extra-curricular activities at the school.

Ms. Campbell also expressed her issues with not having enough time when asked about how she planned for differentiated lessons. She stated: “Like we all work together for the most part with our subject matter at this point but the planning for it...I just wish we had more time.” Ms. Campbell’s lesson plans also showed an absence of planning for differentiation which triangulated the data. She also expressed the overwhelming nature of having so many change initiatives happening at once, particularly within her subject. She stated:

The nice thing about the timing with DI and the bad timing with DI is that we have this new curriculum we’ve been developing so it’s nice to start off with you know everything going towards that but at the same time its overwhelming to plan everything DI from the beginning.

Ms. Campbell seemed to be struggling with trying to effectively implement differentiated instructional strategies at the same time as learning the new curriculum that was created because of revised state standards.

Ms. Sharp seemed to have the most frustration with there not being enough time to accomplish what the district was expecting of the teachers. In commenting on the low- and high- prep mandatory professional development cohort that she was a part, she stated:

First of all, anything that starts with high prep, I'm not interested in because everything is high prep, you know? I prep enough. I just feel like, especially when I just taught AP, it wasn't worth my time to go and figure out what I could do because I had so much to get done already.

Ms. Sharp had expressed the most frustration about the differentiation goal out of all of the teachers. The time factor was just one of the contributing working conditions that caused her to feel more negative towards the goal.

As the perceived environment at the school seemed to offer no time for teachers to plan for effective activities this may have been why some of the teachers made surface-level sense of what it means to differentiate in the classroom. When I say surface-level sense, I refer back to the types of changes that are initiated in a typical work environment. The differentiation goal required a *third level change*, one that called for transformative teaching practices, to be made (Spillane et al., 2002). However, many teachers often associated differentiation merely with the general examples provided by the district rather than truly using it to connect with their own subject-matter and to restructure the lessons they were delivering.



**Meaningful professional development and socialization.** Although time presented a major challenge to most of the teachers interviewed, there were other factors that impacted the positive and negative feelings experienced by the teachers and the ways that they made sense of the goal. There were patterns found in two major topics amongst the teachers. One was the professional learning that they engaged in that was related to differentiation and the other was the socialization experienced surrounding the reform initiative. Both of these factors played additional roles in whether or not the teachers felt positive or negative about the goal. They also impacted the sense that the teachers made of the goal as well.

In discussing professional learning, one of the first patterns that emerged was an introduction to differentiation in college amongst many participants. Five teachers spoke specifically about their connections to differentiation in college. Four of the five teachers had more positive feelings about the goal and seemed to have a higher readiness level for initiating it than teachers who did not have differentiation in college. Mr. Downey stated:

I was coming out of college right then and that was the big buzz word at the time, but it's just a new word for doing what teachers have really been doing. They've just put a new label on everything.

He also spoke about his feelings towards the goal when it was implemented: "It's really about: to be a teacher, do your job. It's just common to me that you're not going to leave anyone behind." Mr. Downey also spoke about how he tried to help some of the other teachers who had less experience with differentiation. Furthermore, he spoke about the strong relationships he developed within his professional learning community: "Whether it be reaching out to students on different levels or different activities that we did, which

did fall under differentiation, we would absolutely share it with each other.” He also spoke about the willingness of his PLC to dive right into the goal.

Along the same lines, when asked about her feelings about the goal, Ms. Dantini responded: “We had talked in my undergrad a lot about differentiated instruction so all of this was stuff that I was already familiar with. It wasn’t brand new for me.” She also spoke about the positive interactions she had with her undergraduate classmates about differentiation. Ms. Dantini also went into detail about readings she had done on grouping strategies and different personalities of students.

Mr. Marcus spoke about his feelings on the differentiation goal, which seemed to be neither positive nor negative. However, he seemed to feel very comfortable and willing to implement it. He stated: “I took a college class on DI so it wasn’t nearly as much of a culture change for me as you see with some of the other teachers and the way they kind of reacted to it.” Although he admitted to not attending the school’s professional development workshops, he discussed how he engaged in more subject-specific PD with his colleagues: “We would just kind of have conversations about things we were going to do with our classes and figure out different strategies.” Mr. Marcus also engaged in critical conversations about assessment and grading with his colleagues that impacted his instruction prior to the differentiation goal being implemented. This will be discussed in more detail in the last section.

Along the same lines, Ms. Masters, who had an optimistic attitude towards the DI goal, commented:

I had a positive outlook for it. I felt like coming out of college, differentiation was something that should definitely be explored more so I was excited that at my first

job, just a year in, they were looking to explore and make that a major goal for the whole staff. I also appreciated that they started to bring in professional development opportunities and learning opportunities for teachers to see the different resources that were out there and methods.

Ms. Masters also discussed how she found a lot of value and ideas from within her professional learning community and at the after school workshops focused on differentiated instruction.

Other teachers, who did not have targeted college education in the realm of differentiation, found value in the professional development workshops and professional learning community conversations that took place. The teachers who attended the workshops and had positive conversations generally felt more positive and willing to implement the initiative. For instance, Ms. Dilks, who felt positive about the goal, commented about how she was meeting the goal constantly with her PLC. She said: “We did talk about it and we talked about what we were doing to reach the goal.” She also attended the school’s summer academy workshops and after school workshops targeting differentiated instruction.

Similarly, Ms. Dickerson also attended the summer academy workshops and after school workshops. Ms. Dickerson also exhibited willingness to engage in the reform effort. Her interactions though were mostly with her co-teacher. When asked how she was involved in the reform with other teachers, she replied “with my co-teacher, we discussed how we would differentiate.” Although initially overwhelmed by the initiative, Ms. Dickerson seemed to be more indifferent about the goal but did feel as though it was her responsibility to differentiate to all of her students.

The one teacher who had more negative feelings about the goal, Ms. Sharp, spoke about how the way she learned about differentiation in college was different than the school's definition. She stated:

I feel like the stuff I learned about differentiated instruction in college is different than how it's implemented here...like in college differentiation was more you want to teach in a variety of ways. Here, I feel like it's more we have to give the kids different ways to prove what they know but I feel like we're expected to do that for everything. I feel like if you're constantly saying 'alright every assignment can have a variety of ways it can be done' and the kids are going to constantly pick the things that they are good at, I don't think that's benefitting them because then they aren't improving in the things that they aren't good at.

Ms. Sharp also went on to say "I took it in the sense of how I learned it in college which I don't think is Winston high school's version." She also spoke about her conversations with a close colleague and their personal research into differentiation and how they could not find any material to support its effectiveness.

The experiences that teachers engaged in seemed to have an impact on not only their sense of differentiation but also their feelings behind it. Those who felt as though prior experiences, discussions with colleagues, and learning opportunities provided them with relevant strategies to implement in their classrooms had more positive feelings about the goal and/or were more willing to commit to it. These seemed to be the individuals who adapted new strategies to fit in with older teaching habits. However, those who had conflicting messages and struggled with how to implement strategies in their classroom, felt more challenged by the goal. The two individuals who struggled the most with the

goal were the ones who had already engaged in professional learning that fundamentally shifted their teaching. Perhaps they were having difficulty trying to adopt a new strategy when they were already experiencing effectiveness with their current methods.

### **Personal Connections with the Detracking Initiative**

Although there was a relationship between professional learning and socialization and the sense that teachers made of the goal, another unique factor had an influence on the sense that teachers were making of the goal: their prior experiences with the detracking of the school's lowest level courses. As discussed previously, the sensemaking process is critically impacted by an individual's situation and context (Spillane et al., 2002). In other words, the context of an individual's processing of knowledge can critically affect the sense they are making of a change initiative (Coburn, 2005). In this particular context, the occurrence of the detracking of the lower level classes within the school taking place prior to the differentiation goal being implemented made this situation and study all the more unique. In the following section I address my second research question which sought to analyze the relationships between experiences with detracking and the sense that was made of the differentiation goal.

**Prior experiences with the detracking reform.** There were two teachers who had prior experiences with general level courses, Ms. Dilks and Ms. Campbell. These teachers were present when the detracking reform effort took place at Winston High School. There were many similarities in the sense that was made of the detracking initiative and how it related to student learning between these two teachers. Two major differences also presented themselves. One teacher believed strongly that the general level courses should be brought back to the school while the other did not feel that way.

This difference may be because of the difference in successes seen in the classrooms of these teachers.

When asked about the benefits of having the general level classes, both teachers seemed to agree that it helped to provide a non-academic pathway for students to be able to graduate and enter into a non-college field after high school. Ms. Dilks commented:

It was nice that we had the opportunity to take the same curriculum and present it in a way that would help the general students be successful in their career and that may not be college but we had the opportunity to show them how to apply the curriculum on a level that was going to be more appropriate for them.

Ms. Dilks also commented about her concerns with the lack of vocational training in present-day schools. She seemed to be suggesting that there were still credible pathways for students to take after high school that do not require a college education. This feeling may have stemmed from Ms. Dilks' belief that the elimination of the courses was done to ensure all students go to college. Her feelings were at odds with this reasoning.

Therefore, although she respected the decision, she disagreed with the outcome and wanted to bring back the general level classes.

On the other hand, Ms. Campbell was less sure of the reasoning behind the move to eliminate the general level courses. She thought it was just a decision that was made by the state and that the teachers were never really given the "big picture." Ms. Campbell had similar feelings to Ms. Dilks about the benefits to the general level courses. She stated:

It allowed some of those kids to just get through high school...they had other things going on in their lives and they didn't have the supports at home and they

just needed to be able to graduate, have a diploma, get emancipated, join the military, or find another path in life that wasn't academic.

Ms. Campbell also added that although at the time it was an advantage, she was not sure if this same mentality fit in with today's world.

Both teachers had similar struggles with the students in these classes. Ms. Dilks commented: "It was challenging because of the behavior issues sometimes." While Ms. Campbell stated: "Behavior issues in those classes could be difficult because some of those kids if you're not yelling or screaming, they don't think you mean it."

### **Differences in sense linked to struggles with differentiated instruction.**

Although these teachers had similar experiences with the general level courses, they differed in their feelings on whether or not the school should bring them back. Since the theory of sensemaking links prior experiences to how individuals process information, studying the similarities and differences in the sense made between these two teachers adds a valuable finding to my research.

One of the differences in the discussions with these two teachers was that Ms. Dilks felt the same as she had felt in the past about these classes. She stated: "I am concerned that the lack of general level courses along with the change in the lack of our vocational school programs is causing a need that we are not filling." When asked whether she thought it was better to have more heterogeneous classes or more homogeneous ones, she commented: "It's better to keep them separate. That's probably not the preferred answer but I've done both and I just think it's more successful when you keep them separate." Ms. Dilks is taking her prior experiences with these classes and linking them to the effectiveness of her current classes, believing that bringing the

general classes back would be more beneficial to the students. Similarly, she commented that she was unsure of whether or not her students were performing better in her subject-area.

On the other hand, Ms. Campbell felt as though times had changed and that the reason for having the general level classes was no longer valid in today's society. When speaking about her current heterogeneous classes, she stated:

I think it's a better real-world representation...they're going to be in the real world and run into different people and have to work with different people in their life. I am okay with the Academic thing we have going now and the no General level classes.

Ms. Campbell believed that with the world becoming more and more diverse, students need to learn to work more with people who are unlike them in order to be more successful.

Another major difference between these two individuals was that they both scored very differently on the RTOP instrument. Ms. Dilks fell into the lower range of scores, with her lesson lacking conceptual learning, real-world application, and proper supports for students. On the other hand, Ms. Campbell fell into the higher range of scores, presenting a lesson with conceptual learning, adequate support systems, and meaningful feedback to students. Sensemaking research suggests that the sense made by individuals in a certain context is impacted by their prior negative and positive experiences. In this case, Ms. Dilks seemed to be having less success in the classroom than Ms. Campbell. Therefore, bringing back the general classes could be a way to make her more successful. This idea was validated by a probing question that I asked her about how comfortable she



was with teaching these classes. She stated: “I was very comfortable with it. It was also rewarding because you saw them understand and apply the material. There was nothing wrong with that.” She also went on to say that when the general level classes were eliminated, she struggled immensely. On the other hand, Ms. Campbell admitted that she struggled with teaching the general level students at times in the past. Although Ms. Campbell’s reformed teaching methods were not linked to the implementation of the differentiation goal, she seemed to be having more success in a more mixed classroom utilizing DI strategies. These two different experiences with the general level courses in addition to successes and struggles with the current differentiated techniques taking place have been impacting the sense these teachers are continuing to make about the capability of differentiated instruction to reach all learners.

**The importance of sustainable change.** There was also another major commonality found between these two teachers who had been through the prior detracking initiative. The theme of needing more time to be able to more effectively implement this goal was brought up only by these two teachers who had experienced a prior major reform effort with no supports or time given to adjust. Both teachers commented that not only did they need more time but they appreciated the district focusing on the needs of the teachers. Ms. Dilks stated:

I feel like we need more work on it. Like I know we were saying earlier this is not a one year goal. I think we need several years to implement this and be more comfortable with it because it’s huge.

Ms. Campbell also commented how she appreciated the out-of-district workshop she attended but also stated “we need more time to get better at this.” These two teachers

seemed to have a better grasp on the nature of change and how it has been playing out over the years due to their prior experiences with reform. Since the prior reform did not integrate any research-based effective detracking supports for the teachers and the new reform has implemented more supports, they seemed to have more hope with the differentiation goal in the long run. Although not explicitly stated, they have come to the understanding that the sensemaking process takes time to be effectively interpreted and implemented.

Although the teachers appreciated the time provided to be able to more effectively implement the goal over a few years, they also agreed to varying extents that the gap in their academic classes was too large to be assisted fully by differentiation. However, Ms. Dilks seemed to believe more strongly that this gap was a huge detriment to the learning taking place within her classroom. On the other hand, although Ms. Campbell agreed that differentiation may not be enough to impact all students, she did feel as though it was helping. Overall, she felt as though having real-world representation within her classroom with students of mixed learning performances outweighed the urge to want to bring the general courses back.

As a rival explanation to why the one teacher wanted to resort back to the general level classes, some researchers may argue that because of pre-conceived notions of ability, teachers want to keep students in certain tracks. Although these two teachers spoke about students not going to college, they also discussed, when probed further, that they felt as though if any students did not want to be in the general classes, they should have the option as to which level they wanted to be in. Wanting students to be in the general classes for the one teacher was more a matter of how she felt she was better able

to reach her students and it was what she had known how to do best in prior experiences. Both teachers were also in full agreement that “general level students” could do the same work at “academic level students.”

On the other hand, the other six teachers who did not have prior experiences with detracking did not have anything to compare their current Academic courses to. Their answers about whether or not they wanted to bring back the general level classes were much less opinionated, as most even acknowledged that they were not sure of whether or not they would want to bring them back. These teachers also did not mention the value of long-lasting change and the importance of sustainable reform. This could have been because they did not see the immediate consequences of the drastic change that was made when the general level classes were eliminated.

### **Connecting Sensemaking and Implementation**

A major connection that I wanted to explore was between the sense the teachers were making of the reform and the way it was being implemented within the classroom. Sensemaking theorists suggest that class culture and routines stem from the way in which teachers make “micro-momentary actions” (Coburn, 2005, p. 487). The action that is chosen is based upon selected information from the situation that is then interpreted and acted upon. With new initiatives, implementing agents must construct understanding of new information. Most do this by connecting it to information that is familiar to them through a pre-disposed lens with which they view a situation (Spillane et al., 2002). Teachers who effectively change need to engage in dissonance in order to determine that current practices are ineffective. Then, resources need to be targeted towards the reform idea and how to effectively implement it as knowledge is restructured (Spillane et al.,

2002; Weick, 1995). There were various themes that emerged that connected the sense that was made of the differentiation goal and the reformed teaching strategies that were carried out in the classroom. In this final section, I will address my third research question that links sensemaking to practice.

**Fundamental shifts.** A major relationship discovered was that teachers who had engaged in prior professional learning that changed more traditional core beliefs about teaching and learning had higher scores according to the RTOP. A commonality between the higher scoring teachers was that the main examples they provided within their descriptions of differentiation in their classrooms involved individual student assessment. Additionally, these teachers were all a part of the same professional learning community. Two of these teachers also explicitly discussed prior, more traditional teaching methods implemented before the differentiation goal was initiated compared to current more reformed methods. This finding contributed to the major overall conclusion that none of the teachers reformed their teaching as a result of the differentiation goal. A piece of evidence in the interviews that helped to triangulate the data and corroborate this finding was that a majority of the participants who were interviewed discussed how they did not feel as though the differentiation goal had a major impact on their instruction. Class artifacts consisting of the assessments used also assisted in corroborating these findings.

Mr. Marcus spoke about how he and a colleague had been introduced to standards-based grading and retakes. He spoke about how these types of non-traditional teaching methods changed the way he approached teaching. He stated “I can work with each student based upon what they are struggling in, they can make a plan for retaking an assessment, and then they have a second chance to show me what they’ve learned.” Mr.

Marcus's notions about assessing students also changed when he was introduced to the idea behind retakes and allowing students another chance to learn the material in his class in order to master it.

Ms. Campbell was also one of the three teachers who discussed prior major shifts in core beliefs about student learning. For instance, Ms. Campbell spoke about her shift in teaching that had taken place prior to the district's differentiation goal being introduced:

I can provide examples from when I first started teaching and I had a textbook. It was a very comfortable, regular way of teaching the Physical Science. Basically the students...each section of the textbook they would read and take notes on and then before I would present the next section on the power point, we would do a quiz to make sure that they had taken the notes so that when they watched the power point or when I went through the power points, they had the notes. All they had to do was add to it or make little notes to themselves and then there would be a practice worksheet after that. So it was a very cyclical thing. The kids were comfortable with that; they knew what was coming next. It was something that I was very comfortable with. It was not very exciting. You know we would do demonstrations and talk about things but the kids were not ever interacting with each other very much except during lab situations. It was all very teacher-driven. Then, she discussed how her teaching fundamentally changed when she was introduced to a professional learning model that put students at the center of the learning:

Yesterday we did a vocabulary activity. In previous years I would have given a list and said 'look up the words in the glossary, write them down for homework,

that's your vocabulary.' This time what we did was we had the vocabulary words on one piece of paper and the definitions on the other. We had half the class over here and half the class over there. I gave half the class definitions and half the class words and they had to find their mate and once they thought they had their mate, then we all lined up and we decided were they right, were they wrong. We had kids at the end that were like 'wait a minute, this is the only word that's left, this doesn't match mine.' It makes them interact with it. It makes them actually think about the words. It took a whole period to get through nineteen words but I've got to say, we gave a little Check for Understanding today and out of the 12 words I put on there, I chose 12 of the more difficult words, the ones that we emphasized were difficult and how they were related, that my average was probably around an 8 or 9 out of 12 which is not a bad average for something that was just presented yesterday to them. So to me that's a valuable thing and those kids that need the kinesthetic, those kids that need the interaction to be up and moving around, that need to be forced to read something and not just...cause when you write and just copy something, mindlessly, they're not even thinking. So that kind of activity helps a lot of the kids. Could some of the kids have done just fine just writing? Absolutely. Would some of them probably preferred that? Some of them probably would have preferred just sitting down. I kept telling them "stand up." But alright that's an activity that we did that was different that I would not have done before."

One might argue that this was a change that came about because of the differentiation goal, but when asked whether or not, it was the goal, Ms. Campbell stated that "it was

more likely the shift in the structuring of her class” that caused her to make these changes prior to the differentiation goal being introduced.

The major shift in core beliefs for Ms. Sharp seemed to have taken place in the way in which she assessed and provided feedback to students. In her beginning years, she provided students with the typical “good job” on an assessment, or “you need to do better on the next assignment” type of sayings. However, once she started to embrace student improvement, she broke some of the typical traditional teaching methods by altering what a 100% on a test might mean in addition to allowing students to retake all assessments in her class. For instance, she discussed this topic in more detail below:

I mean for today, I told the students instead of them getting a 12 out of 12, they needed to get a 10 out of 12 and that would still be a 100 because it’s not a test, it’s just a formative type of thing. And I’m not trying to slam them for not having every single detail down pat. I just want them to try individually to see where they are.

Ms. Sharp also spoke about her retake policy and how it was voluntary. She stated “It allows them another opportunity to learn the material. I don’t know if it’s considered DI because they’re not going above what was expected. They’re just finally getting there.” This statement further reflected Ms. Sharp’s struggles between her own ideas of what she believes effective teaching to be and what she believes the district’s definition of differentiated instruction is.

On the topic of success for students Ms. Sharp stated “It’s not just success in my terms, it’s success for them. You know, what’s good for that kid. And just always praise improvement and effort.” Some of her frustrations came along with claims that she was

already practicing effective strategies within her classroom and planned long hours for lessons that would reach her students.

One teacher who was observed to demonstrate reformed teaching strategies but who scored more towards the middle-upper range on RTOP was Ms. Masters. She seemed to have undergone a transformative realization in the realm of professional learning but scored lower than the others. Ms. Masters stated:

I didn't even know there were different learning styles until college so when I learned that...I remember that hit me hard and I kind of carried that with me and that became one of the biggest things that I focused on. I think I got this idea in my head that if I taught only one way, I would be an ineffective teacher.

In addition to this epiphany and Ms. Masters' practice of allowing students to retake their assessments, I would have predicted her scores to be markedly higher. In order to determine why this was not the case, I broke her scores on the RTOP apart according to sections.

In lesson design and implementation, Ms. Masters scored in the mid-range. The lowest area she scored on was about focusing the lesson on ideas originating from the students. In the content realm, Ms. Masters seemed to have a solid grasp on the content herself but struggled in getting all of her students on board with some of the questions she was posing. In the area of classroom culture, she scored lowest on encouraging the students to be communicative and allowing them to focus the lesson. Most of the issues within each of these areas dealt with classroom management. As Ms. Masters was one of the newer teacher participants, and newer teachers often struggle with student behaviors, this could have been negatively impacting her overall score.



In the realm of sensemaking, individuals often approach reform by trying to place new ideas into existing practices in order to comply with what is required (Spillane, et al., 2002). Therefore, when a new initiative is introduced, involving new practices that require major shifts in philosophies, a struggle with the implementation may be a key part of the process of effective sensemaking. It can be concluded that the goal initiated by the district was not implemented by the teachers in such a way that reformed their prior educational practices. Another major piece of data that helped to triangulate this finding was that in looking at prior lesson plans, seven of the eight teachers had not changed the way in which they planned out their instruction. Additionally, there was no evidence of differentiated instruction in the curriculum documents for any of the courses.

As a rival theory, some may argue that teachers purposefully do not implement change because it does not fit in with their own agendas (Berman & McLaughlin, 1978; Weatherley & Lipsky, 1977). However, it was evident that out of the eight teachers interviewed, seven of them wanted to effectively implement the goal and a majority of them felt as though they were already effectively implementing it even though in reality they were not, which was evident in their statements about implementation.

**Compliance does not equal reformed teaching.** Although Ms. Campbell, Ms. Sharp, Mr. Marcus, and Ms. Masters demonstrated reformed teaching practices, others did not. The pattern that stood out when interviewing many of the participants who were not demonstrating reformed techniques was that they all seemed to either think they were already differentiating or they quickly brought functional examples into their lessons in order to be compliant. For these teachers, success was defined as compliance. These teachers believed that since they were implementing examples provided by the district

that they were demonstrating reformed teaching techniques. However, according to the RTOP tool, they were not. This idea seemed to help many of the teachers interviewed and others in the school to cope with the reform effort. As an output of the sensemaking process, individuals naturally try to incorporate existing practices into new ones in order to comply with a reform effort. I believe this also helped those individuals to develop more positive attitudes towards the goal. However, positivity and compliance did not necessarily translate into reformed teaching practices in the classroom.

For example, Ms. Dilks, who was positive about the goal and quick to implement strategies, spoke about the many differentiated activities that she was implementing in the classroom: “We tried jigsaw method, we tried choice menus, we played Kahoot games... We tried a lot of things. It was quite fun.” The evidence of her using activities that generated surface-level changes was triangulated by the evidence provided in her classroom observation. In her lesson, she implemented an element of flexible grouping, but the students seemed genuinely confused. Some even commented that they were more confused after the group activity than prior to it.

Another teacher, Mr. Downey, who was positive about the goal and felt as though he was already differentiating displayed similar habits. He stated:

So a lot of people asked me constantly, ‘What is differentiation to you?’ And I said ‘It’s really what we have been doing.’ I feel many other people in the teaching community are so worried like ‘I’ve got to re-learn what differentiation is.’ And I’m like ‘No, it’s what you’ve been doing. You’re an effective teacher, reaching out to all levels that you have in your class and you’re doing that...’

In discussing how he implemented differentiated practices in the classroom, he mainly spoke about activities that he implemented. For example, he spoke about implementing choice menus, tiered homework, and flexible grouping strategies. In his interview he discussed the arrangement of the desks in his room: “All of my desks are formed so that if they’re in a certain row, they are in a heterogeneous group but then if they turn and talk to someone next to them, they are homogeneous.” His observation did show evidence of flexible grouping, as the students were arranged in the classroom in strategic ways to allow him to easily assign them to a heterogeneous or homogeneous group, however, his methods of teaching were teacher-centered. A majority of the lesson was centered on him talking to the students with little to no assessment. Evidence that triangulated these findings was his low score on the RTOP instrument.

Another teacher who focused mostly on activities rather than the fundamental shift in learning was Ms. Dickerson. When asked about the differentiation goal, she responded that right in the first year of initiation she and her team implemented choice menus: “That was the big thing for that year for us was choice menus so we were all about getting our choice menus done.” She then spoke about how she implemented aspects of flexible grouping in the following year. Ms. Dickerson also emphasized that she utilized station teaching a lot where she could reach a smaller group of students in addition to choice in homework assignments. In the observed lesson, Ms. Dickerson implemented student choice in grouping. However, the purpose behind this was for the teachers to see where the students chose to go and where they were comfortable. However, much of the lesson was teacher-centered with little opportunity for students to practice with the material. Additionally, much of the learning was about memorization

rather than trying to teach more of the fundamental concepts behind the lesson. The data gathered from the RTOP instrument triangulated these pieces of evidence as Ms.

Dickerson also received a lower score.

**Discussions of values and differentiation linked to practices.** In addition to linking belief-altering professional learning to reformed teaching techniques, I was also able to link beliefs and values to practices. One of my research findings was that the way teachers discussed how students learned along with the way in which they spoke about the purpose of education seemed to connect with how they defined differentiation and the examples they provided. This also played out in how they implemented some of the strategies within their classes and the way in which their teaching methods measured up to the RTOP instrument. All of the teachers' definitions of differentiation aligned with how they thought students learned best. However, the more complex and meaningful descriptions within these categories seemed to connect to higher RTOP scores (see table 2). Additionally, among those who had higher scores, there was a pattern in how they referred to students when speaking about the purpose of education. Teachers who discussed some form of individualized purpose of education were those participants who had higher RTOP scores (see table 2).

The chart below summarizes the relationships found between teachers' core beliefs of learning and the purpose of education and how they defined DI along with the examples discussed and demonstrated in the classroom. As seen below, all of the individuals made connections between how they felt kids learned best and their definitions of DI. However, the more complex these descriptions were, the higher they scored on the RTOP instrument. Additionally, the provided and practiced examples also

connected with the discussions that took place within the interview. Finally, the more their ideas about the purpose of education were linked to discussions of individuals, the more their teaching practices were found to be effective

Table 2

*Connections between Sense and Implementation*

Teacher	How Kids Learn Best Connected to Definition of DI	Analysis of Descriptions	Purpose of Education	Examples Provided Connection	RTOP Score
Downey	Connected	Narrow	Generalized	Connected	< 1
Dickerson	Connected	Narrow	Generalized	Connected	< 2
Dantini	Connected	Vague	Generalized	Connected	< 2
Dilks	Connected	Vague	Generalized	Connected	< 2
Masters	Connected	Complex	Individualized	Connected	> 2
Campbell	Connected	Complex	Individualized	Connected	> 2
Marcus	Connected	Complex	Individualized	Connected	> 2
Sharp	Connected	Complex	Individualized	Connected	> 3

*Note.* Table 2 demonstrates the linkages between various factors of sense made by teachers in relation to their score on the RTOP instrument designed to measure reformed teaching methods in science and mathematics classrooms.

When asked how she thought students learned best, Ms. Masters replied:

“Students have different learning styles so it’s more about what kind of learning style they associate with or they best connect with and I also feel like that can change for each

student from class to class.” This connected with her definition of differentiated instruction. When asked to define DI, Ms. Masters stated: “Teaching the way the student learns...teaching to the actual student rather than to the test or to the material.”

Furthermore, when asked about the purpose of education, Ms. Master’s commented:

So, I’ve played with this a lot because you hear kids all day talk about ‘Why do I have to learn this’...But ultimately I think it’s about ‘you don’t know what tomorrow’s going to bring, what’s going to come your way or what you’ll want to do with yourself, so you want to learn as much as you can about as much as you can because you don’t know what tomorrow is going to bring you.

Ms. Master’s spoke about the purpose of education more in the realm of having high expectations for each child and keeping all possibilities open.

Ms. Masters also went on to discuss specific class strategies she used to implement differentiated instruction: “I had one student who was really struggling with a topic even though I had already shown two different ways to solve the problem. So I showed her a third method that would work that I didn’t show to others.” She said that this method helped the child to understand the concept being discussed. Ms. Masters’ lesson plans and artifacts also demonstrated evidence of individual student tracking along with working with students one-on-one and showing them multiple ways to solve problems.

When asked how she thought students learned best, Ms. Dantini responded: “I think it depends on who they are.” This connected with how she defined differentiated instruction. In her definition, she stated: “I would define it as tailoring your instruction to the needs of various students, based on their interest and ability levels and all that.” In

discussing the purpose of education, Ms. Dantini said that it was “to help us be competitive on a global level and help us to continue to learn and improve as a human race.” This purpose was somewhat generalized to all students rather than individualized.

Ms. Dantini then went on to discuss some examples of differentiated instruction in the classroom. She spoke about how she provided a tiered assignment for students at different learning levels within the topic she was teaching. Ms. Dantini spoke about how the one group of students received a more challenging task, while the others received a broken down and more scaffolded task.

Mr. Downey’s concept of how students learned best and his definition of differentiation also seemed to connect to one another. When asked how students learned best, he responded with “I’d say the best way to learn is to give accessibility to the knowledge.” Then, in defining differentiation, he stated: “It’s about creating that accessibility to all students...” These two answers seemed narrower than other participants’ answers and may have been one of the contributing factors behind his low score. Mr. Downey also described the purpose of education in the realm of society rather than the individual when he stated: “If you build up an educated society, then your infrastructure is going to grow.” Mr. Downey then went on to discuss how he had students “working in their differentiated groups consistently,” where he would provide the same material and depending on the difficulty level, place them in either their homogeneous or heterogeneous groups.

Another connection between the definition of differentiation and how students learn best was made in Ms. Dickerson’s interview. Her idea of how students learned best was “when they’re engaged, when they’re comfortable, when they’re not afraid.”

Similarly, when she defined differentiation, she included: “trying to give students all those opportunities to feel comfortable in the learning environment.” Both of her answers are linked to “comfort,” however, they do not have any depth. She describes the purpose of education: “If people are educated, the better society will be. The smarter people are, the better off we all are, not just a few but everyone.” This quote seemed to generalize to all students rather than individual ones. Ms. Dickerson then went on to discuss examples of how she often provided students with choices when doing assignments. She felt as though these helped students to feel comfortable and they appreciated it.

On the other hand, there were a few teachers whose definitions of how students learned best and definitions of differentiation not only matched up but also were described in much more complexity and detail. Additionally, the way in which they discussed the purpose of education related more to students as individuals rather than a group.

When asked how students learned best, Ms. Campbell replied, “I don’t think you can generalize...you need to figure out which students are learning one way and try to present as many different angles coming at new information as you can.” In her definition of differentiation, Ms. Campbell stated that it’s “instruction that meets the kids where they’re at is the short hand version.” These two discussions not only connected with one another but they were much more descriptive and complex than participants who had scored at lower levels according to RTOP. Another complex answer was provided when Ms. Campbell discussed what she thought the purpose of education was:

I migrated to the idea that I need to use my subject area as a vehicle to teach students how to problem-solve and not just problem-solve in a literal sense but to



approach something they've never seen before and work through it with grit...I

want them to get away from that fixed mindset and more into a growth mindset...

In this same description, Ms. Campbell went on to discuss how she explicitly told them that they all had different starting points from which they could grow.

One of the main examples she provided connected with her definition of DI. She spoke about an activity where the students were working on a graphing assessment. Ms. Campbell mentioned that she had a large portion of students who performed poorly. In order to address this, she gave the students who were successful another lab simulation to work on while she worked with the other students one-on-one. As mentioned before, Ms. Campbell initially struggled with the goal when it was first implemented. Although she admitted that she continued to struggle with implementing DI, Ms. Campbell felt better about the goal after the school kept it. In the realm of sensemaking, Coburn (2005) emphasizes that in order for some individuals to truly evolve, they must make incremental changes.

Another example of a teacher whose idea of how students learned best and definition of differentiation matched up was Mr. Marcus. His answers were also much more intricate than those individuals who had lower scores according to RTOP. In response to how he thought students learned best, he replied: "I think they are learning the most when I'm giving them some type of individual practice and I am walking around and answering individual questions rather than keeping them as a full class." This answer connected with his definition of differentiated instruction. He defined DI as "grouping students within your class in appropriate levels, kind of based off of what they know coming into your class..." He also added that DI was about knowing where his students

were at individual levels. In terms of the purpose of education, Mr. Marcus discussed what he felt it to be:

I think we educate students to make them well-rounded and whether their next goal is going to college or going into a trade school or going into some other profession, we're just trying to make them more comfortable to be themselves and be around other people.

Mr. Marcus is discussing how he feels individuals should be able to be themselves in the educational system.

Mr. Marcus also discussed one of his major ways of implementing differentiated instruction: "I like using individual whiteboards, where we're still a group but they are individually doing their own thing. And then I can kind of look up and do a quick formative assessment." Mr. Marcus's example seemed to connect explicitly with how he felt students learned best and with his definition of differentiation.

### **Importance of Methodology**

In order to ensure valid and reliable data, it was important to not only plan out a detailed course of methodology but also to follow through with the plans made to guarantee quality research was conducted. Additionally, my choice to engage in research that was qualitative in nature allowed me to truly grasp the sensemaking that took place amongst the teachers at Winston High School. I was also able to keep my study focused by ensuring that I was constantly examining my research questions as I analyzed the data each time I completed an interview and observation.

The ways in which I collected the evidence through interviews, observations, and documentation allowed for me to triangulate the data that I found. For instance, the

examples that teachers discussed in interviews that were used as evidence of practices were validated when they were seen in the classroom observations. Additionally, documents such as professional development plans and artifacts handed out to the students during class helped me to gain further insight into the lessons being given by the teachers along with the thoughts behind planning and implementation. The nature of the interviews being semi-structured, in particular, allowed for me to gather more information if I needed clarification. They also allowed me to validate some of my interpretations in terms of what the teachers were saying by implementing probing questions. Additionally, utilizing a pilot test assisted in further refining my final interview questions to ensure they were presented in a clear way.

Utilizing the RTOP tool which measured reformed math and science teaching techniques allowed me to be objective by first writing elements of the observation down and then giving them a score. I was also better prepared to use this outside tool because of the training that was provided for it by the creators of the instrument. The scores and elements of the RTOP allowed me to focus not only on differentiation but how strategies were playing out into the classroom and how the bigger picture of learning was being carried out by the teachers. Furthermore, utilizing critical colleagues by having them read through and rate the observations helped to further validate my data and observational findings.

As the interview data were transcribed, I immediately read through the transcripts to underline the main points each time I conducted an interview. When all of the interviews had finally been conducted, I read through the documents numerous times to eliminate extraneous information and to focus only on the topics that were of importance

to my research questions. I then used highlighters to pick out different themes along with side notes to pick out various findings.

In addition to analyzing the interview data as I went along, I did the same for the observational data. I also would rate the individual after I was able to go back through my objective notes. Within the notes, I also included descriptions of the lesson artifacts. Once I felt as though I had reviewed the data enough to pick out all of the themes, I started to put all of it together.

I took pieces of the interviews, observations, and documents to create an initial codebook, organized into various patterns that I picked out. I utilized “in vivo” and “descriptive” coding techniques as previously described. I was then able to take this initial codebook and make it more formalized. I created themes, connected them to my theory and research questions and then explained what the quotes and descriptions meant. I utilized this final codebook in order to write my findings and create necessary tables.

I was also able to maintain the validity of my research by maintaining the following: construct validity, internal validity, external validity, and reliability. In order to ensure construct validity, I used multiple sources of data in addition to using my codebook to connect quotes to the research questions posed. In addressing internal validity, I constructed an interview protocol to eliminate questions that brought about inferences. Additionally, I addressed rival explanations in the realm of sensemaking to try to eliminate other possibilities for my findings (Yin, 2014). I created external validity by ensuring that my findings could be generalized in the realm of sensemaking (Yin, 2014). Lastly, I ensured reliability by sending the transcripts to participants in addition to closely following my case study protocol.

## **Limitations, Biases, Assumptions, and Insights**

Although a case study allows a researcher to observe individuals in their specific contexts, there are still areas within the realm of the study that have limitations. The first limitation experienced was trying to gather participants for my study. I had originally planned to saturate my data. However, when I initially reached out to the department chairs of the math and science departments, no one responded. I had to follow-up numerous times and eventually reach out to about 40 potential candidates individually. Even then, it was difficult to get responses. Although I ended up with eight participants, I would have liked to have gathered a few more. I also believe that those who agreed to participate were individuals who favored me when I was a supervisor and teacher within the district. Additionally, five of the eight participants were non-tenured. This may have had an impact on some of the answers that were provided.

In addition to being limited in the number of participants I was able to gather, I was also limited in some of the information I could disclose. There are some places within my findings where I have not dug into because of limited anonymity. Since the school has had a large number of teachers leave the district and new teachers come in, some of the differences in experiences were more identifiable. Some of the characteristics of certain individuals may have identified who they were. Therefore, I had to leave out some key information that may have also provided more evidence for my findings.

Another limiting factor was trying to gather participants who were present within the school when the original detracking initiative took place. In the past few years, the school experienced a large amount of retirements and teachers transferring to other school districts. I believe my data would have been even stronger if I would have been

able to include more participants who were present when the elimination of the general level courses took place.

As a researcher, I must also address the biases that I inherently had while conducting the study. The teachers I observed were all individuals I had observed in the past as a supervisor within the district and teachers who I had been colleagues with when I was a science teacher in the building. These past relationships may have contributed to some of my scorings. However, I did my best to address this by sticking to my objective notes on each participant.

Additionally, since I was a teacher present in the school when the detracking initiative took place and I was in favor of the change, I tried to not let that impact the way I probed certain questions regarding the detracking initiative. Furthermore, as one of the administrators behind the initiation of the differentiation goal, I tried to not let my prior position influence the way I probed questions or responded to some of the negative answers I received. I admit that I wanted the goal to be more successful but made assumptions before conducting this research that it had not been.

On the other hand, as a former teacher and administrator I was able to provide more insight than an outside researcher would have been able to do since I was more familiar with the context of both reform efforts. In knowing the teaching habits of many teachers, I feel as though I had more of a broader picture of the observation and the behind-the-scenes work they had done in their classrooms. Logistically it was also easier for me to schedule interviews and observations in the school since I knew many of the personnel working there.

## **Implications for Sensemaking**

The literature on sensemaking discusses how individuals, as an output of the sensemaking process, take new information and place it into pre-existing knowledge (Spillane et al., 2002). The individuals who were a part of this study did just that. They placed the term differentiation into their pre-existing beliefs of education, adopted strategies, and implemented them in the classroom. For these teachers, being compliant with the goal was a way to be successful. Therefore, they adopted activities and implemented them in procedural ways without fundamentally changing their teaching philosophies. Some of these teachers were very positive about the initiative and believed in it while others adopted it because they felt it was a part of their responsibility as a teacher.

In studying some of the literature on change, various researchers discuss the importance of buy-in in order to engage individuals in reform (Kotter, 1996). My research adds to this literature by suggesting that buy-in without critical, fundamental change on *third level* reform initiatives will do little to truly change a practice. Similarly, positivity and willingness also do not necessarily lead to meaningful sense being made. In actuality, those who struggle more with reform and those who engage in a shift of traditional beliefs may be the individuals who are actually making more meaningful sense out of an initiative or those who are already enacting parts of the reform. Furthermore, although breaking down and redefining a change may make individuals feel better about it, this does not necessarily mean that they are changing their existing practices, as was the case for many participants in this study. Individuals need to problematize reform and connect with it in order to be able to truly implement effective transformative change.

I believe that I also added to the literature on sensemaking by comparing what participants said and provided examples for in their interviews to not only the practices they enacted in the classroom but also to the effectiveness of their instruction. In doing this, I was able to measure the extent to which individuals were reforming according to the RTOP instrument. I also brought in the term “surface-level” change as it related to sensemaking by suggesting that those with lower scores were implementing the changes by simply incorporating them into existing practices and not truly reforming their styles of teaching. Research has suggested that teachers require substantial resources, attention from leaders, content-focused professional development, and in-depth exploration of content in order to truly make meaningful gains in reforms that require fundamental changes (Coburn, 2005).

Additionally, I was able to discuss positive, negative, and indifferent feelings of the change initiative and intertwine these feelings with how the teachers made sense of the reform. For instance, I went beyond the research on sensemaking that states that teachers create shared understandings with social groups that surround them along with developing understanding based on prior experiences (Coburn, 2001), to discuss how they also develop similar feelings towards initiatives based upon the individuals with whom they interacted and experiences they engaged in. Interacting with other individuals who felt more positive about the change and engaging in experiences where the participants felt positive about it impacted the feelings of the participants regarding the reform under study. The same was true about those interacting with other people or experiences that left the participant feeling more negative about the reform.



The context of this study also brought in the sense that participants made of two reform initiatives, the detracking one and the differentiation one. Using the sense that was made out of a prior reform initiative and analyzing how it influenced the sensemaking of a second change in the same organization is something that has not yet been accomplished amongst sensemaking theorists. This may add to future research that studies the impact of numerous changes on the sensemaking of individuals within an organization.

Finally, another major finding of my study in the realm of differentiation was an extension of how Spillane et al. (2002) discussed what changes require, that is a fundamental conceptual shift that requires an examination of existing beliefs. However, when changes are introduced to individuals who are already enacting reformed efforts, additional change can seem frustrating. My research was able to detect that in some cases of sensemaking, there may be individuals who do not need to necessarily change their fundamental beliefs about a reform effort if they have done so in the past and are making meaningful strides.

## **Chapter 6**

### **Conclusions and Implications**

One of the underlying themes of this research is the nature of how change impacts individuals on their own personal levels. Individuals, as part of their cognition, tend to resort to familiarity and stagnancy. Stagnancy in society, however, is something of the past as our world continues to develop more technologies, create and use more data, and inherit unforeseen global issues as a result of advancement. Will our advancements save us or leave us in despair? Only the future will tell. However, the one thing that we can count on is that advancement will continue to happen whether we are prepared for the consequences or not. The jobs of the future will require a more extensive workforce to be skilled in the areas of science and mathematics (Koebler, 2012; Rogers-Chapman, 2015). The education of our students is one of the most important tools that we have in ensuring that the future of our global society flourishes and is sustained.

Present-day education, however, continues to lag behind the evolution of society as schools continue to struggle to effectively adopt reforms. As a formalized system that has remained unchanged for such an extended period of time, the educational system of the United States is often slow to adapt. At the heart of this system in districts all over the country, are the teachers, who bear the brunt of numerous change policies that come their way from external factors seemingly unconnected to education. Educators face not only changing policies both internally and externally, but they deal with an unpredictable work environment on a daily basis in the students who come to them from various backgrounds. It is with the teachers that education's greatest hope lies. These are the individuals who are said to have the greatest impact on our students (Fullan, 2007).

Former president, Barack Obama, expressed his concern about the state of education and the future for STEM in 2013 when he said:

One of the things that I've been focused on as President is how we create an all-hands-on-deck approach to science, technology, engineering, and math. We need to make this a priority to train an army of new teachers in these subject areas, and to make sure that all of us as a country are lifting up these subjects for the respect that they deserve (Mizell & Brown, 2016; White House, 2013).

Although no longer our president, the concern for STEM education is still very real and concerning. In particular, the teachers who educate students in the areas of STEM are the ones having the most impact on the professionals of the future.

Similarly, research in the educational realm focusing specifically on STEM teachers is extremely important. Since our society needs changes made to how students are educated so that we can build a stronger STEM workforce, studying how teachers interpret and implement reforms that are initiated is extremely valuable. Teachers are the ones who are on the front lines when it comes to the critical education that is being delivered to students. If research on sensemaking and implementation can provide more insight into the change process and provide ways in which change might be implemented more successfully, then it is worthwhile and meaningful. Any efforts made to increase achievement in the STEM fields will be helpful to society.

### **The Goals of the Research**

The purpose of my research was to examine how high school mathematics and science teachers were making sense of the district's differentiation goal and how they adapted instructional strategies in light of the sense they made. Additionally, I wanted to

determine what factors were impacting the sense that they made. More specifically, I wanted to also see if the detracking initiative that had been initiated in 2009 impacted the sense that the teachers were making of the differentiation initiative.

I was able to gather various contextual factors that impacted the sense that teachers made of the differentiation goal including: the number and scope of district initiatives, the clarity of the goal, the time and support provided, the professional development available, and socialization factors. I was also able to make concrete connections between the ways teachers thought students learn best and how that linked to their definitions of differentiation, the examples provided, and the practices that were carried out in the classroom. I was also able to see the patterns that existed amongst the teachers who were present during the detracking effort versus those who were not present.

Finally, I came across a finding that I was not expecting. Although I had propositioned that the teachers were implementing differentiated reformed teaching strategies in surface-level ways, I did not think that there would be some teachers who were as effective on the RTOP scale as they were found to be. Two of these teachers were the ones who struggled the most with the reform. I was also able to make clear connections between what had impacted their effectiveness. Surprisingly, their success was not due to the initiation of the differentiation goal. Rather, they had gone through some form of belief-changing experience that impacted how they taught and assessed students. Furthermore, they were a part of the same professional learning community. This discovery sheds light on the types of changes that need to be implemented in order to enact more effective reform.

## **General Implications**

As previously stated, some of the findings from this study shed light on the types of professional learning that can have the most impact on individuals. However, the changes discussed in this research started with individuals at the top, policy-makers. Government officials need to begin to think about how to craft policies and messages in a thoughtful way so that the type of change that is truly sought after can actually take place. For instance, when the state initially developed the college and career ready standards that all students were expected to master and mandated that schools adopt these new standards, they should have more carefully crafted a way for schools to be able to effectively ensure that all students were able to achieve. Rather, many schools adopted new curricula for their lowest level classes, while few detracked these courses, as Winston High School had done. As a result, schools have continued to struggle to ensure their students are achieving on these levels.

Some of the factors that impede the process of crafting more meticulous policies are most likely due to varying opinions on governmental interventions, limited resources, and time. However, if more funding was targeted towards professional learning programs that implement more initiatives that stem from the bottom of the chain rather than the top, this may be one way to help incorporate more teacher PD that harnesses and changes fundamental beliefs about learning that need to be shifted.

More specifically, policy makers need to find specific research-based strategies in various content areas in order to enact more effective reform. One of the science teachers spoke about the intense professional learning she engaged in that incorporated social constructivism into her science education. These types of programs should be provided to

teachers as resources to initiate effective change. They would also help to eliminate time spent having to create classroom tools since many will have already been developed. The resources may also help to cultivate more collaborative and productive strategies amongst groups of teachers (Coburn, 2005).

Another general implication for practice from this research is that pre-teacher training needs to fundamentally shift the way in which the teaching profession is perceived and the way in which educators carry out reforms. Areas that target more progressive ways of thinking about teaching and learning should be cultivated in institutions. Although students may show similar trends in wanting to learn more about educational strategies rather than theory, it would be of major benefit to show the connection between the two in order to foster a meaningful teaching philosophy. Student teaching should also incorporate elements of theory as college students engage in real-world application of teaching strategies. Educational training programs should receive adequate funding to be able to initiate this type of training amongst not only teachers but also educational leaders.

In general, more research needs to be pursued in the areas of sensemaking as a part of pre-teacher training. Additionally, research should be funded that targets the ways in which certain successful programs, that have changed teacher values and fundamental beliefs, reach individuals and develop ultimate success with implementation. These programs should be sought after, funded, and utilized in various school districts.

### **Professional Implications**

As an educational leader, this research sheds light for me on the types of professional learning that teachers need to be engaged in. Workshops or trainings that

convey examples for teachers to carry out are not the ones that are going to fundamentally shift long-standing beliefs that teachers hold about teaching and learning. For instance, most of the workshops at Winston focused exclusively on sample classroom practices and strategies including: implementing choice menus, designing tiered homework assignments, initiating flexible grouping, and creating low- and high- prep strategies. Although the teachers implemented these strategies, their core-beliefs about student learning were not shifted from prior traditional philosophies. I need to be able to find experiences for educators that will make them question their current practices, contemplate new philosophies, and implement new practices. These professional learning experiences need to be sustained and reflective in order to be effective.

There has been research done in the field that studies how leaders can more effectively deliver meaningful messages to individuals within organizations. Researchers have coined a similar phrase to be an output of sensemaking called “sensegiving” (Maitlis & Lawrence, 2007). This term has been adopted by theorists in order to explain how leaders provide meaningful learning opportunities to followers, ones that fundamentally change perceptions and beliefs about an organization as a whole (Maitlis & Lawrence, 2007). Since the desired outcome of a third level change is some form of a cognitive shift, this method of delivering learning experiences may prove to be beneficial.

I also need to be wary of how changes are implemented within the school rather than how they are perceived. I often tend to feel as though teachers who are positive about changes are the ones who do not need the assistance. However, this research has shed light on the idea that willingness and positivity toward a reform do not necessarily mean the reform is being implemented effectively. Along the same lines, I need to

examine the overall effectiveness of strategies implemented as a result of reforms and not just whether or not strategies are being implemented in order to determine the true extent of the change taking place within the classroom.

Furthermore, in looking at the bigger picture of Winston High School and the amount of changes that took place all at one time, I believe that administrators need to consider how large numbers of reform efforts can overwhelm educators. Taking steps to present reform in a more meaningful way that shows connections between transformative change initiatives can help individuals to process them as one large endeavor rather than numerous ones. This may also make the reform efforts seem not as overwhelming if they are seen as linked to one another.

As previously mentioned, the idea of teacher buy-in often plays a large role in making plans for reform (Kotter, 1996). As an educational leader going through the doctoral program, I often used Kotter's theory of the change process to discuss plans for reform. However, sensemaking has brought in new feelings toward this process. Kotter's theory needs to be expanded upon further to incorporate sensemaking into the initial stages. It becomes very easy to believe that people who are positive and excited about change are implementing it effectively. Educational leaders, including myself, need to consider more the outcomes of reform rather than individual emotions and compliance. Educational leaders should also not get caught up in a step-by-step change method. They need to be adaptable and willing to meet individuals where they are coming from.

**Sensemaking connected to leadership style.** In the process of change, there are many factors that leaders need to take into consideration when attempting to effectively carry out initiatives. The theory of sensemaking has provided more evidence that leaders



need to be flexible in various types of situations. It further expands upon the current research that states that successful leaders are those who can adapt their behavior to meet the requirements of their own unique environment by suggesting that leaders must also critically analyze and address individual situations and cognitive thought processes (Gates, Blanchard, & Hersey, 2002).

As an educational leader within my district I need to consider situations not only in the realm of the occurrences taking place within the school but also each individual's "situated cognition" and the lens through which they are currently viewing the initiatives being implemented (Spillane et al., 2002). Then, I need to carefully provide them with ways in which they can see current practices as problematic. Finally, I will need to dedicate time and resources to assisting them in restructuring their knowledge.

Expanding situational leadership to incorporate sensemaking is an additional feature that makes this study unique. Furthermore, it ensures that this case is generalizable to the theory of sensemaking. As more schools continue to incorporate third level changes, they will need to consider not only the context of their setting but also the cognitive stances of the teachers in order to more effectively enact change (Spillane et al., 2002).

**Plan of action.** As an educational leader, it is my responsibility to develop professional learning experiences that will make meaningful impacts on the instruction that is taking place in the classrooms of our school. As a result, I plan to research more ways to enact sensegiving strategies within my school. Furthermore, I would like to conduct my next research study on the process of effective sensegiving strategies. I will

also try to come up with more activities in workshops that get teachers to question themselves, if necessary, and the practices they are utilizing within their classrooms.

I am also the person in charge of all the professional development workshops and trainings for the district so I feel as though my findings from this study will be directly relevant to what I do on a daily basis. In my role, I plan to come up with activities that force the teachers to question themselves and their teachings. I must engage teachers in cognitive dissonance in order to get them to begin to change their views. As a result of this process, teachers will naturally assimilate, accommodate, or reject reform efforts (Weick, 1995). However, if I can concentrate targeted support and resources toward engaging the teachers in the reconstructive process I believe that it will be more successful. In order to create an atmosphere of change, teachers must take a critical look at what they are doing and see it as problematic (Spillane et al., 2002). Creating this type of dissonance will then create an opportunity for them to reconstruct their understanding of new initiatives. For instance, I plan to engage teachers in data discussions about student performance results by having them take a look at the overall data without getting into the specifics of the questions. I plan to have them create a data protocol, with my assistance, and use it within their PLCs to have valuable discussions regarding their unit benchmark assessments. In addition to this, I will need to follow up with them to see what changes have been made to instruction and the overall effectiveness of their lessons.

In addition to finding ways for teachers to reconstruct knowledge, I also plan to further investigate the teachers from my study who exhibited the reformed teaching techniques. I would like to go back to them and ask what specific types of professional development caused them to fundamentally shift how they thought about student learning

and assessing. Asking these same teachers to engage in relevant conversations with others from the same subject-areas would also be of benefit. Furthermore, I would like to seek out other teachers who have engaged in content-specific and research-based professional development that can be further explored in my current school setting.

Another way I am trying to enact effective change is by combining sensegiving strategies with storytelling. Implementing change through storytelling techniques is somewhat similar to sensegiving and incorporates many of the strategies required for effective sensemaking to occur (Denning, 2011). Research has found that storytelling assists in initiating action by getting individuals to work together toward a common goal because they understand both the broader and specific purpose behind the change (Denning, 2011). For instance, leaders engage implementers in the broader picture story of a change and why it needs to occur and then discuss a more personalized story about an individual involved in the change (Denning, 2011). Taking a close look at why the change needs to occur and the issues with the present state of the situation builds into inciting a desire for the change to occur among individuals (Denning, 2011).

In order to implement elements of effective storytelling and sensegiving, I have initiated a book club within my school that will target books chosen by the group that ultimately connect somehow with education. The books are meant to be enjoyable and the club is meant to be a place where honesty and openness are valued. The first book that we chose was a New York Times bestselling book called *Becoming Nicole*. It is a book about a transgender student and the struggles she encountered in her journey of changing from a male to a female. Many of the teachers in the book club already have preconceived notions about transgender individuals and my hope is that this book will

help the teachers to see these children in a different light, which will ultimately change some of their values behind identity. This type of experience will provide teachers with the time needed to process information and see perspectives from a different point of view. The book club will also assist me as a leader to further develop the sensegiving process by developing storytelling techniques to help better facilitate belief altering reform.

**Final thoughts.** My research on sensemaking has fundamentally changed how I believe individuals come to understand new concepts and implement elements of reform. I believe that my engagement in this topic has allowed me to truly take into consideration the mindsets of others when it comes to change and why it is often so difficult to achieve successful results. Additionally, it has allowed me to question my own outputs of reform and further reflect upon ways in which I can continue to improve as an educational leader.

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## Appendix A

### Case Study Protocol

#### A. Overview of the Case Study

##### Mission and goals:

The purpose of this study is to examine how high school science and mathematics teachers are making sense of the district's current differentiation effort and how they have adapted instructional strategies in light of this reform effort. I will be targeting a high school that recently adopted a district differentiation initiative along with interviewing science and math teachers about their views and practices as a result of the reform effort. The school is unique in that it had undergone a major change initiative that eliminated its lower-level classes, termed the *general* classes in 2009. This was done in response to the state of New Jersey's revised graduation requirements to ensure students were being adequately prepared for a college and/or careers. The school was one of the few that has eliminated the lower-level courses. Most of the other schools renamed the courses and revised the curriculum. Due to the contextual circumstances of this initial change and the district's delayed enactment of differentiation to assist struggling teachers with these new, more heterogeneous courses, the study is very unique.

##### Research Questions:

1. How do individual worldviews, experiences, and contextual factors impact the sense that teachers are making of the district differentiation goal?
2. How do individual experiences with detracking, in particular, impact the sense that teachers are making of differentiation?
3. How does sensemaking relate to the reformed differentiated methods of instruction enacted by the teacher within the classroom?

##### Theoretical Framework:

I utilize the theory of sensemaking to guide my study. Sensemaking originally stems from Weick's (1995) book titled *Organizational Sensemaking*. In this book, Weick discusses the various components of sensemaking and its role in the larger scheme of organizations. He stipulates that sensemaking, in a theoretical sense, is a way of understanding how an organization works.

Defining sensemaking in an organizational sense can be very broad. This is why it was important to find literature that related sensemaking specifically to education. Two main researchers brought sensemaking to the educational field. Researchers, Cynthia Coburn (2005) and James Spillane (1999) suggested that existing worldviews, the social arena in which individuals work, and the nature of their connections to the initiative or policy

influence the way in which teachers come to understand and enact educational policy. Additionally, work done by Spillane, Reiser, Reimer (2002) related the process of sensemaking to the various large-scale changes being implemented in education. These researchers understand the significance of sensemaking and the impact that teachers can have on educational reform efforts in school systems.

Role of the protocol:

This protocol will be used to guide the researcher to ensure I am staying on task in terms of examining my research questions and staying focused on my line of inquiry.

## B. Data Collection Procedures

Names of Contacts:

Superintendent

President of the Board of Education

High School Principal

Math Department Chair

Science Department Chair

Data Collection Plan:

After IRB and board of education approval, I will reach out to gatekeepers and gather volunteers for my study. I will then schedule a time for interviews to go over informed consent and interview and observation procedures.

I will provide all volunteers with an overview and discuss any discomforts they may have. I will relay that they can decide to not participate at any time.

I will have a pen, paper, and computer for taking notes

Interviews

I will set up a calendar for interviews and observations with participants

I will have my recording device and ensure they are okay with me recording them

Interviewees

High school science and math teachers



At least two years of experience at Winston who have been there for the differentiation goal implementation

Willing to give up time for interview and willing to be observed and provide documentation

I will be cognizant of their time and availability

#### Observations

Events to be observed: math and science classroom lessons

#### Document Collection

Lesson plans

Curriculum documents

#### Expected Preparation Prior to Fieldwork:

IRB approval

Contacting Superintendent and Board of Education for board approval of study

Making myself available to the Board of Education for any questions they may have

The rationale for this research is to be able to make connections between the sense that teachers make and the implementation measures they take as a result of the sense that is made. The findings of this research may help to structure reform initiatives in ways that positively influence teacher implementation of initiatives.

I have already taken courses through the Collaborative Institutional Training Initiative for the Protection of Human Subjects throughout my research. Through my informed consent document, participants are made aware of the fact that participation in my study is voluntary and can be withdrawn at any time. I also state that there are no risks and/or anxieties associated with the research and discuss the ways in which I plan to collect data. Participants are also made aware that the information collected will be kept confidential.

In order to ensure the guidelines for protecting human subjects are followed, I will be sure to meet with participants directly before the interview to go over the informed consent and answer any questions they may have. I will also make myself available to them should they have any further questions.

#### C. Data Collection Questions

In 2009, Winston High School eliminated all of its lower-level classes in the school as a response to new state graduation requirements stipulating that all students needed to graduate high school as college and career ready. Prior to 2009, the school had four levels of classes including (from low to high): general, academic, honors, and advanced placement. The general level courses were not aligned to state standards and, therefore, were deemed unacceptable by the curriculum director at the time. As a result, she eliminated them from the school schedule. In the following years after this elimination of classes, data gleaned from state tests continued to show major gaps in performance between the school's minority and special education subpopulations. These students were also the ones who had been more likely to be placed in the general level classes when they were in existence. As a result of this information, the school administration decided to implement a district differentiation goal in 2014. Gaining teacher insight into the reform efforts taking place during these time periods will be critical to determining the sense that they made at the time. The following questions will be considered:

What are teachers' worldviews of education in general?

How do teacher worldviews impact the sense that they make of detracking and differentiation?

What experiences have the teachers had with detracking?

What experiences have the teachers had with differentiation?

What are some of the contextual factors surrounding the differentiation initiative?

What sense did teachers make of the differentiation initiative?

How do teachers implement differentiation in the classroom?

How do teachers' experiences with detracking impact the sense they make of an initiative?

How does the sense that the teachers made of differentiation initiative impact the implementation of it in the classroom?

How have teachers changed instructional methods as a result of the differentiation initiative?

What patterns will emerge when connecting sensemaking and implementation of differentiation in the classroom?

How will I identify emerging patterns between sensemaking and differentiation among various teachers?

#### D. Guide for the Case Study Report

The outline of this case study will include an introductory unit, a contextual unit, a unit for the literature review, a methodology unit, a unit on findings, and a conclusions and implications unit. The research is being conducted as a requirement for my dissertation and will be presented to my dissertation committee. Once reviewed, it will be published through the university. The intended audience will be individuals in the educational field. Outcomes from the completion of the dissertation will be creating professional development for educators and educational leaders that can have a more positive impact on implementation of reform efforts.

## **Appendix B**

### **Request for Approval to Conduct Research at Institution**

#### **Making Sense of School Reform: A Case Study of Mathematics and Science Teachers' Sensemaking within One District's Differentiation and Detracking Initiatives**

Dear Winston High School Superintendent and Board of Education,

I am in the process of completing my educational doctoral dissertation at Rowan University and am seeking your approval to conduct my research at Winston High School. You should be aware that you are free to decide not to participate and are free to withdraw at any time without affecting your relationship with me, the school, or Rowan University.

The purpose of this study is to examine how high school science and mathematics teachers are making sense of the district's current differentiation effort and how they have adapted instructional strategies in light of this reform effort. The approach to research will involve a single case study design.

I plan to collect data during the timeframe of June 2016 to February of 2017. Within this time period, I will be visiting the school on various occasions to gather relevant information. Prior to my visit I will provide notice of visitation to the school principal and research participants.

Data will be collected in three different ways: through interviewing, by conducting observations, and by collecting relevant documents. I will be conducting observations utilizing a teacher evaluation tool referred to as Reformed Teaching Observation Protocol. (RTOP). RTOP is a standardized instrument used to determine the degree of instructional reform being implemented in current science and mathematics classrooms. I will also perform interviews with individuals using an interview protocol with questions pertaining to my specific research questions that help to address the purpose of my study. I will also collect documents (including lesson plans, curriculum, and lesson artifacts) utilizing, once again, the RTOP instrument. In this case, I will use the beginning portion of the RTOP targeted specifically for lesson plan design and content to analyze.

Please know that there are no risks and/or anxieties associated with this research. All participants in the study will be included on a volunteer basis. The district's name along with the teachers who volunteer to be a part of the research will not be associated with the findings. I will be the only one who will know the identities of those participating.

The research will not alter or impact instructional time with students. Although I cannot share my specific findings with you because of confidentiality purposes, it is my hope that the published study will help to further enhance differentiation professional development efforts for the district, as the findings of my study will be made public. The benefits of the district's participation include being able to help add to the bank of research on the way teachers make sense of new reform initiatives, especially those in the

realm of detracking. Please do not hesitate to ask any questions before, during, or after my study.

Thank you for your time and consideration,

Katelyn Daplyn Skinner, Ed.D Candidate, Rowan University

## **Appendix C**

### **Human Subjects Consent-to-Participate Form**

Making Sense of School Reform: A Case Study of Mathematics and Science Teachers'  
Sensemaking within One District's Differentiation and Detracking Initiatives

#### **CONSENT TO TAKE PART IN A RESEARCH STUDY**

**TITLE OF STUDY:** Making Sense of School Reform: A Case Study of Mathematics and Science Teachers' Sensemaking within One District's Differentiation and Detracking Initiatives

**Principal Investigator:** Dr. Jill Perry

This consent form is part of an informed consent process for a research study and it will provide information that will help you to decide whether you wish to volunteer for this research study. It will help you to understand what the study is about and what will happen in the course of the study.

If you have questions at any time during the research study, you should feel free to ask them and should expect to be given answers that you completely understand.

After all of your questions have been answered, if you still wish to take part in the study, you will be asked to sign this informed consent form.

As a member of the study team, I will also sign this consent form. You will be given a copy of the signed consent form to keep.

You are not giving up any of your legal rights by volunteering for this research study or by signing this consent form.

#### **FINANCIAL INTERESTS:**

None

#### **A. Why is this study being done?**

The purpose of this study is to examine how high school teachers are making sense of the current differentiation effort and how they have adapted instructional strategies in light of this reform effort.

**B. Why have you been asked to take part in this study?**

You are being asked to participate in this study because you have met the following criteria:

1. You are a science or mathematics teacher
2. You are currently teaching an academic course
3. You have been an educator within this high school for two years or more

**C. Who may take part in this study? And who may not?**

Those who may take part in this study: Individuals over the age of 18, mathematics teachers, science teachers

Those who may not take part in this study: administrators, students, non-mathematics teachers, non-science teachers, non-educators

**D. How many subjects will be enrolled in the study?**

Approximately eight subjects will be enrolled in this study. However, this number is subject to change based upon the data that are collected.

**E. How long will my participation in this study take?**

The entire study will take place over a period of *eight months*. As a participant, I will ask you to spend *approximately one* day a month for *two* months participating in this study. Each session will last approximately *one to two* hours.

**F. Where will the study take place?**

The study will take place on the high school campus. You will be asked to meet in an available conference room or classroom for an interview. After the interview, I will ask to schedule an observation of a lesson of your choosing to take place after school has started in September.

**G. What will you be asked to do if you take part in this research study?**

As a potential participant in this study you will be asked to partake in an interview, with the opportunity for follow-up questions. The interview will take place in either a classroom or conference room within the high school and last approximately one to two hours. After the completion of the interview, I will ask for documentation items that correspond with certain interview questions. After the interview I will also schedule a time to conduct an observation that will last the length of the class period or no longer than one hour.

**H. What are the risks and/or discomforts you might experience if you take part in this study?**

Please know that there are no known risks and/or anxieties associated with this research.

**I. Are there any benefits for you if you choose to take part in this research study?**

There are no direct personal benefits associated from taking part in this study. Your participation may help us understand which can benefit you directly, and may help other people to gain more information on the way teachers make sense of new reform initiatives.

**J. What are your alternatives if you don't want to take part in this study?**

There are no alternative treatments available. Your alternative is not to take part in this study.

**K. How will you know if new information is learned that may affect whether you are willing to stay in this research study?**

During the course of the study, you will be updated about any new information that may affect whether you are willing to continue taking part in the study. If new information is learned that may affect you, you will be contacted.

**L. Will there be any cost to you to take part in this study?**

There is no cost associated with taking part of this study.

**M. Will you be paid to take part in this study?**

You will not be paid for your participation in this research study.

**N. How will information about you be kept private or confidential?**

All efforts will be made to keep your personal information in your research record confidential, but total confidentiality cannot be guaranteed. Your personal information may be given out, if required by law. Presentations and publications to the public and at scientific conferences and meetings will not use your name and other personal information. All participant names will be coded from the initial recording of the data. The code identifiers will be hand-written and kept in a secure, locked location. Myself and the principal investigator will be the only ones able to access the code identifiers.

**O. What will happen if you are injured during this study?**

If you are injured in this study and need treatment, contact *Counseling Services*, *Healthcare provider*, or the *Wellness Center* and seek treatment.



We will offer the care needed to treat injuries directly resulting from taking part in this study. Rowan University may bill your insurance company or other third parties, if appropriate, for the costs of the care you get for the injury. However, you may be responsible for some of those costs. Rowan University does not plan to pay you or provide compensation for the injury. You do not give up your legal rights by signing this form.

If at any time during your participation and conduct in the study you have been or are injured, you should communicate those injuries to the research staff present at the time of injury and to the Principal Investigator, whose name and contact information is on this consent form.

**P. What will happen if you do not wish to take part in the study or if you later decide not to stay in the study?**

Participation in this study is voluntary. You may choose not to participate or you may change your mind at any time.

If you do not want to enter the study or decide to stop participating, your relationship with the study staff will not change, and you may do so without penalty and without loss of benefits to which you are otherwise entitled.

You may also withdraw your consent for the use of data already collected about you, but you must do this in writing to Principal Investigator, Dr. Jill Perry located at Rowan University, 201 Mullica Hill Road, Glassboro, NJ 08028.

If you decide to withdraw from the study for any reason, you may be asked to participate in one meeting with the Principal Investigator.

**Q. Who can you call if you have any questions?**

If you have any questions about taking part in this study or if you feel you may have suffered a research related injury, you can call the Principal Investigator:

Dr. Jill Perry  
STEAM Education  
856-256-4000 ext. 3819

If you have any questions about your rights as a research subject, you can call:

Office of Research Compliance  
(856) 256-4078– Glassboro/CMSRU

**What are your rights if you decide to take part in this research study?**

You have the right to ask questions about any part of the study at any time. You should not sign this form unless you have had a chance to ask questions and have been given answers to all of your questions.

---

**AGREEMENT TO PARTICIPATE**

I have read this entire form, or it has been read to me, and I believe that I understand what has been discussed. All of my questions about this form or this study have been answered.

Subject Name: \_\_\_\_\_

Subject Signature: \_\_\_\_\_ Date: \_\_\_\_\_

**Signature of Investigator/Individual Obtaining Consent:**

To the best of my ability, I have explained and discussed the full contents of the study including all of the information contained in this consent form. All questions of the research subject and those of his/her parent or legal guardian have been accurately answered.

Investigator/Person Obtaining Consent: \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

## Appendix D

### Interview Instrumentation: Branches of a Tree Method

*Research Question 1: How do individual worldviews, experiences, and contextual factors impact the sense that teachers are making of the district differentiation goal?*

What **experiences** have you had in education?

I want to start by talking to you about your experiences as a teacher.

- What are your areas of certification?
- How many years have you been teaching? Where have these experiences been?
- What courses do you teach now? Which have you taught in the past?

What are your **worldviews** on education?

- Do you believe general level students can do the work required in academic classes?
- In general, how do you think students learn best?
- What do you believe the purpose of education is?
- Why do you think society should value education?
- Do you believe all students should be held to the same learning expectations?
- Do you feel as though classes that are more heterogeneously mixed have more value for students than those that are more homogeneous?

What **sense** are teachers making of the differentiation goal?

- Do you feel as though differentiation adequately addresses teaching to heterogeneous classes?
- How do you define differentiation?

-Why do you believe the school differentiation goal was originally introduced? What was the purpose of it?

-Do you feel as though this goal has helped to improve your instruction?

The first time the district introduced the differentiation goal, the goal read in the PDP plan as follows:

From July 1, 2014 through June 30, 2015, teachers will be able to choose appropriate *differentiated instructional methods and learning activities* (i.e. Universal Design for Learning) to address the unique and diverse academic needs of students through effective and appropriate implementation.

-What was your interpretation of this?

The second year of the differentiation initiative, the goal was revised to read:

From July 1, 2015 through June 30, 2016, all teachers will explore, choose, and implement appropriate differentiated instructional methods that address the unique and diverse academic needs of students through effective and appropriate implementation. Teachers may choose one of the following DI strategies to focus: low prep & high prep strategies, teaching with differentiated resources, student choice, technology, flexible grouping, Universal Design for Learning or Problem-Based Learning.

-Was your interpretation of the goal different in the second year?

What are some of the **contextual factors** involved in the differentiated initiative?

- How would you describe the school environment after the district introduced the differentiation goal to the teachers in year one?

-What types of conversations did you engage in related to the reform with other teachers and administrators?

-How would you describe the school environment after the district continued with the differentiation goal in year two?

-Did you ever discuss your successes or struggles with other teachers?

What were some of the conversations that took place?

-Were you ever provided an opportunity to converse with others in a professional learning community on the topic of instructing classes with a diverse array of learners?

- What types of professional development, teacher education, or experiences have you been involved in that have influenced your ability to teach in a more differentiated way?

***Research Question 2: How do individual experiences with detracking, in particular, impact the sense that teachers are making of differentiation?***

At Winston High School, we used to offer general level courses in addition to academic, honors, and AP. These courses, the general level ones, were for our lowest performing students.

- Have you ever taught any general level courses when we had them here at WHS?

- If not, have you taught any general level courses anywhere else?

- What were your experiences with the general level classes that were here at Winston?

-What was your comfort level with them?

-Did you find immediate success with instructional strategies? Gradual success?

Or did you struggle?

- What is your understanding of why the general level classes were originally eliminated?

Were you given a rationale?

- Is that a conclusion you came to? How did you come to that understanding?
- How do you feel about there no longer being general level courses at Winston High School?

***Research Question Three: How does sensemaking relate to the reformed differentiated methods of instruction enacted by the teacher within the classroom?***

What **methods** do you employ to differentiate instruction?

- Since the initiative was introduced, did you change your instructional strategies in the classroom?
  - If so, how?
- What differentiated instructional practices have you implemented in your classroom?
  - Do you have lesson artifacts?
- How do you plan for differentiated lessons?
  - Do you have lesson plans you can share with me?
- Describe a typical lesson inclusive of differentiated techniques to reach a diverse array of learners.
  - How do you make these activities more successful?
    - Which of these strategies do you prefer to use? Explain.
    - Do you struggle with any of them?
      - Can you discuss these struggles?
- How do you implement other aspects differentiated learning activities such as grouping, grading, participation encouragement, roles, monitoring, motivating?
- Have you integrated methods for reaching a diverse array of learners within the curriculum?

-If so, please describe.

-If not, why not?

-Can I have a copy of your curriculum?

How have teachers **changed instructional strategies** since the reform has been implemented?

-How would you compare the level of learning in your current classes to those from before the differentiated instruction initiative was introduced?

- In what ways do you provide students with opportunities for learning in different ways?

-Have you changed this method since before the differentiation initiative was introduced?

- How do you address the issue of challenging the different levels of students within your academic class?

- How do you keep all of your learners actively involved throughout your lessons?

## Appendix E

### Research Question Matrix Diagram

Research Question 1: How do individual **worldviews**, **experiences**, and **contextual factors** impact the sense that teachers are making of the district differentiation goal?

What **experiences** have you had in education?

I want to start by talking to you about your experiences as a teacher.

- What are your areas of certification?
- How many years have you been teaching? Where have these experiences been?
- What courses do you teach now? Which have you taught in the past?

What are your **worldviews** on education?

- Do you believe general level students can do the work required in academic classes?
- In general, how do you think students learn best?
- What do you believe the purpose of education is?
- Why do you think society should value education?
- Do you believe all students should be held to the same learning expectations?
- Do you feel as though classes that are more heterogeneously mixed have more value for students than those that are more homogeneous?

What **sense** are teachers making of the differentiation goal?

- Do you feel as though differentiation adequately addresses teaching to heterogeneous classes?
- How do you define differentiation?



-Why do you believe the school differentiation goal was originally introduced?

What was the purpose of it?

-Do you feel as though this goal has helped to improve your instruction?

The first time the district introduced the differentiation goal, the goal read in the PDP plan as follows:

From July 1, 2014 through June 30, 2015, teachers will be able to choose appropriate *differentiated instructional methods and learning activities* (i.e. Universal Design for Learning) to address the unique and diverse academic needs of students through effective and appropriate implementation.

-What was your interpretation of this?

The second year of the differentiation initiative, the goal was revised to read:

From July 1, 2015 through June 30, 2016, all teachers will explore, choose, and implement appropriate differentiated instructional methods that address the unique and diverse academic needs of students through effective and

appropriate implementation. Teachers may choose one of the following DI strategies to focus: low prep & high prep strategies, teaching with differentiated resources, student choice, technology, flexible grouping, Universal Design for Learning or Problem-Based Learning.

-Was your interpretation of the goal different in the second year?

What are some of the **contextual factors** involved in the differentiated initiative?

- How would you describe the school environment after the district introduced the differentiation goal to the teachers in year one?

-What types of conversations did you engage in related to the reform with other teachers and administrators?

-How would you describe the school environment after the district continued with the differentiation goal in year two?

-Did you ever discuss your successes or struggles with other teachers?

-What were some of the conversations that took place?

-Were you ever provided an opportunity to converse with others in a professional learning community on the topic of instructing classes with a diverse array of

Research Question 2: How do individual **experiences** with **detracking**, in particular, impact the **sense** that teachers are making of differentiation?

learners?

- What types of professional development, teacher education, or experiences have you been involved in that have influenced your ability to teach in a more differentiated way?

At Winston High School, we used to offer general level courses in addition to academic, honors, and AP. These courses, the general level ones, were for our lowest performing students.

- Have you ever taught any general level courses when we had them here at WHS?

- If not, have you taught any general level courses anywhere else?

- What were your experiences with the general level classes that were here at Winston?

- What was your comfort level with them?

- Did you find immediate success with instructional strategies? Gradual success? Or did you struggle?

- What is your understanding of why the general level classes were originally eliminated? Were you given a rationale?

- Is that a conclusion you came to? How did you come to that understanding?

- How do you feel about there no longer being general level courses at Winston High School?

Research Question Three: What **methods** do you

- Since the initiative was

How does **sensemaking** **relate** to the reformed differentiated methods of **instruction enacted** by the teacher within the classroom?

employ to differentiate instruction?

introduced, did you change your instructional strategies in the classroom?

-If so, how?

-What differentiated instructional practices have you implemented in your classroom?

-Do you have lesson artifacts?

-How do you plan for differentiated lessons?

-Do you have lesson plans you can share with me?

- Describe a typical lesson inclusive of differentiated techniques to reach a diverse array of learners.

– How do you make these activities more successful?

– Which of these strategies do you prefer to use?

Explain.

– Do you struggle with any of them?

– Can you discuss these struggles?

- How do you implement other aspects differentiated learning activities such as grouping, grading, participation encouragement, roles, monitoring, motivating?

- Have you integrated methods for reaching a diverse array of learners within the curriculum?

-If so, please describe.

-If not, why not?

-Can I have a copy of your curriculum?

-How would you compare the level of learning in your

How have teachers  
**changed instructional  
strategies** since the reform  
has been implemented?

current classes to those from  
before the differentiated  
instruction initiative was  
introduced?

- In what ways do you  
provide students with  
opportunities for learning in  
different ways?

-Have you changed this  
method since before the  
differentiation initiative was  
introduced?

- How do you address the  
issue of challenging the  
different levels of students  
within your academic class?

- How do you keep all of  
your learners actively  
involved throughout your  
lessons?

## **Appendix F**

### **Interview Protocol**

Name of Participant:

Name of Interviewer:

Date:

Time:

Place:

Position of Interviewee/Subject Taught:

#### **Introduction**

The purpose of this interview is threefold: 1. To explore the factors that impact the sense that teachers have made of the district's differentiation initiative, 2. To explore how the specific factors related to the school's original detracking effort have impacted the sense that individuals have made of the school's differentiation effort, and 3. To determine the relationship between the sense that teachers have made of the differentiation initiative and the methods of teaching implementation in the classroom. I will be conducting the interview process in an in-depth manner in order to ensure that I address all aspects of the reform effort of the elimination of the general level courses (Seidman, 2006).

I will be asking you questions in relation to your feelings and beliefs about education in addition to contextual factors. Additionally, I will ask you questions about your experiences with detracking and the district's differentiation initiative. I will also be asking you questions regarding your instructional strategies within the academic

classroom setting. Furthermore, I will also be conducting observations to make connections to the interview questions. I may also ask to use documents related to certain questions such as lesson plans, curricula, and instructional artifacts. Any identifiable knowledge obtained from this investigation will not be shared with anyone. Additionally, the interview will be recorded and transcribed verbatim for analysis purposes. The observation will be recorded on the computer as I observe. Once again, I would like to thank you for your participation. (Creswell, 2008; Seidman, 2006). Do you have any questions before we begin? I would like to go over the consent form with you at this time so that you are aware of your privileges as a participant (read consent form with interviewee).

*I want to start by talking to you about your experiences as a teacher.*

- What are your areas of certification?
- How many years have you been teaching? Where have these experiences been?
- What courses do you teach now? Which have you taught in the past?
- In general, how do you think students learn best?
- What do you believe the purpose of education is?
- Why do you think society should value education?
- Do you believe all students should be held to the same learning expectations?

*As a part of my research I am studying the district's differentiation goal that was a result of an initial detracking initiative when the school eliminated its lower-level courses. At Winston High School, we used to offer general level courses in addition to academic,*

*honors, and AP. These courses, the general level ones, were for our lowest performing students. First, I would like to talk to you about the detracking initiative that happened in 2009 when the district eliminated all of the general-level courses in the school.*

- Did you ever teach any general level courses when we had them here at WHS?

- If not, have you taught any general level courses anywhere else?

- What is your understanding of why the general level classes were originally eliminated?

Were you given a rationale?

-Is that a conclusion you came to? How did you come to that understanding?

- How do you feel about there no longer being general level courses at Winston High School?

- What were your experiences with the general level classes that were here at Winston?

-What was your comfort level with them?

-Did you find immediate success with instructional strategies? Gradual success?

Or did you struggle?

-Do you feel as though classes that are more heterogeneously mixed have more value for students than those that are more homogeneous?

-Do you believe general level students can do the work required in academic classes?

*Now I would like to address the more recent reform that took place, the district's implementation of a differentiation goal.*

-How would you define differentiation?

The first time the district introduced the differentiation goal, the goal read in the PDP plan as follows:



From July 1, 2014 through June 30, 2015, teachers will be able to choose appropriate *differentiated instructional methods and learning activities* (i.e. Universal Design for Learning) to address the unique and diverse academic needs of students through effective and appropriate implementation.

- What was your interpretation of this?
- Why do you believe the school differentiation goal was originally introduced? What was the purpose of it?
- How would you describe the school environment after the district introduced the differentiation goal to the teachers in year one?
- What types of conversations did you engage in related to the reform with other teachers and administrators?

The second year of the differentiation initiative, the goal was revised to read:

From July 1, 2015 through June 30, 2016, all teachers will explore, choose, and implement appropriate differentiated instructional methods that address the unique and diverse academic needs of students through effective and appropriate implementation. Teachers may choose one of the following DI strategies to focus: low prep & high prep strategies, teaching with differentiated resources, student choice, technology, flexible grouping, Universal Design for Learning or Problem-Based Learning.

- Was your interpretation of the goal different in the second year?
- How would you describe the school environment after the district continued with the differentiation goal in year two?
- Did you ever discuss your successes or struggles with other teachers?

-What were some of the conversations that took place?

-Were you ever provided an opportunity to converse with others in a professional learning community on the topic of instructing classes with a diverse array of learners?

- What types of professional development, teacher education, or experiences have you been involved in that have influenced your ability to teach in a more differentiated way?

*Now I would like to get more into the implementation of the goal within your classroom.*

-Since the initiative was introduced, did you change your instructional strategies in the classroom?

-If so, how?

-How would you compare the level of learning in your current classes to those from before the differentiated instruction initiative was introduced?

-What differentiated instructional practices have you implemented in your classroom?

-Do you have lesson artifacts?

-How do you plan for differentiated lessons?

-Do you have lesson plans you can share with me?

- Describe a typical lesson inclusive of differentiated techniques to reach a diverse array of learners.

– How do you make these activities more successful?

– Which of these strategies do you prefer to use? Explain.

– Do you struggle with any of them?

– Can you discuss these struggles?

- In what ways do you provide students with opportunities for learning in different ways?

-Have you changed this method since the differentiation initiative was introduced?

- How do you address the issue of challenging the different levels of students within your academic class?

- How do you keep all of your learners actively involved throughout your lessons?

- How do you implement other aspects differentiated learning activities such as grouping, grading, participation encouragement, roles, monitoring, motivating?

- Have you integrated methods for reaching a diverse array of learners within the curriculum?

-If so, please describe.

-If not, why not?

-Can I have a copy of your curriculum?

-Do you feel as though this goal has helped to improve your instruction?

-Do you feel as though differentiation adequately addresses teaching to heterogeneous classes?

#### Concluding Questions

- Is there anything I have not covered that you would like to discuss at this time?

- May I contact you further if I have any additional questions?

## Conclusion

Closing: I would like to sincerely thank you again for your participation in this qualitative study. The benefits I will achieve through this process will impact the way I look at research and may aid in improving education in an indirect way through my future research. Once again, I would like to remind you that the information gained from this research will not identify you as a participant in any way (Creswell, 2008).

## Appendix G

### Two-Column Observation Protocol

<u>Observational Protocol</u>
Name of Participant:
Name of Interviewer:
Date:
Time:
Place:
Position of Interviewee:
Making Sense of School Reform: A Case Study of Mathematics and Science Teachers' Sensemaking within One District's Differentiation and Detracking Initiatives
Questions: <ol style="list-style-type: none"><li>1. How do individual worldviews, experiences, and contextual factors impact the sense that teachers are making of the district differentiation goal?</li><li>2. How do individual experiences with detracking, in particular, impact the sense that teachers are making of differentiation?</li><li>3. How does sensemaking relate to the reformed differentiated methods of instruction enacted by the teacher within the classroom?</li></ol>
<u>Pay attention to (teacher body language, expressions, activities, word usage):</u>
-Teacher objectives related to maintaining high standards within a diverse student setting
-Educator methods for engagement of students at varying levels
-Classroom set-up and activities related to differentiating instruction (conducive to group work, providing for challenges for different levels of students)
-Teacher individualizing instruction at appropriate points for students who are struggling and those who are excelling
-Educator interactions (body language, expressions, word usage) with students in

<p>academic setting</p> <p>-Teacher response to students' work on assignments (positive or negative to completed work)</p> <p>-Educator closure related to diverse array of learners (success or failure) (Tjora, 2006)</p>	
Length of Observation: 56 minutes	
Descriptive Observations	Reflective Notes

## Appendix H

### Reformed Teaching Observation Protocol

#### Reformed Teaching Observation Protocol (RTOP)

Daiyo Sawada  
External Evaluator

Michael Piburn  
Internal Evaluator

and

Kathleen Falconer, Jeff Turley, Russell Benford and Irene Bloom  
*Evaluation Facilitation Group (EFG)*

Technical Report No. IN00-1  
Arizona Collaborative for Excellence in the Preparation of Teachers  
Arizona State University

#### I. BACKGROUND INFORMATION

Name of teacher \_\_\_\_\_ Announced Observation? \_\_\_\_\_  
(yes, no, or explain)

Location of class \_\_\_\_\_  
(district, school, room)

Years of Teaching \_\_\_\_\_ Teaching Certification \_\_\_\_\_  
(K-8 or 7-12)

Subject observed \_\_\_\_\_ Grade level \_\_\_\_\_

Observer \_\_\_\_\_ Date of observation \_\_\_\_\_

Start time \_\_\_\_\_ End time \_\_\_\_\_

#### II. CONTEXTUAL BACKGROUND AND ACTIVITIES

In the space provided below please give a brief description of the lesson observed, the classroom setting in which the lesson took place (space, seating arrangements, etc.), and any relevant details about the students (number, gender, ethnicity) and teacher that you think are important. Use diagrams if they seem appropriate.

*Note.* From “Reformed Teaching Observation Protocol (RTOP): Reference Manual,” by D. Sawada, M. Piburn, K. Falconer, J. Turley, R. Benford, and I. Bloom, 2000, *ACEPT Technical Report No. IN00-1*. Copyright 2000 by Evaluation and Facilitation Group of the Arizona Collaborative for Excellence in the Preparation of Teachers. Reprinted with permission.

Record here events that may help in documenting the ratings.

Time	Description of Events

*Note.* From “Reformed Teaching Observation Protocol (RTOP): Reference Manual,” by D. Sawada, M. Piburn, K. Falconer, J. Turley, R. Benford, and I. Bloom, 2000, *ACEPT Technical Report No. IN00-1*. Copyright 2000 by Evaluation and Facilitation Group of the Arizona Collaborative for Excellence in the Preparation of Teachers. Reprinted with permission.



III.

LESSON DESIGN AND IMPLEMENTATION

Never Occurred

Very Descriptive

1)

The instructional strategies and activities respected students' prior knowledge and the preconceptions inherent therein.

0

1

2

3

4

2)

The lesson was designed to engage students as members of a learning community.

0

1

2

3

4

3)

In this lesson, student exploration preceded formal presentation.

0

1

2

3

4

4)

This lesson encouraged students to seek and value alternative modes of investigation or of problem solving.

0

1

2

3

4

5)

The focus and direction of the lesson was often determined by ideas originating with students.

0

1

2

3

4

IV.

CONTENT

Propositional knowledge

6)

The lesson involved fundamental concepts of the subject.

0

1

2

3

4

7)

The lesson promoted strongly coherent conceptual understanding.

0

1

2

3

4

8)

The teacher had a solid grasp of the subject matter content inherent in the lesson.

0

1

2

3

4

9)

Elements of abstraction (i.e., symbolic representations, theory building) were encouraged when it was important to do so.

0

1

2

3

4

10)

Connections with other content disciplines and/or real world phenomena were explored and valued.

0

1

2

3

4

Procedural Knowledge

11)

Students used a variety of means (models, drawings, graphs, concrete materials, manipulatives, etc.) to represent phenomena.

0

1

2

3

4

12)

Students made predictions, estimations and/or hypotheses and devised means for testing them.

0

1

2

3

4

13)

Students were actively engaged in thought-provoking activity that often involved the critical assessment of procedures.

0

1

2

3

4

14)

Students were reflective about their learning.

0

1

2

3

4

15)

Intellectual rigor, constructive criticism, and the challenging of ideas were valued.

0

1

2

3

4

*Note.* From “Reformed Teaching Observation Protocol (RTOP): Reference Manual,” by D. Sawada, M. Piburn, K. Falconer, J. Turley, R. Benford, and I. Bloom, 2000, *ACEPT Technical Report No. IN00-1*. Copyright 2000 by Evaluation and Facilitation Group of the Arizona Collaborative for Excellence in the Preparation of Teachers. Reprinted with permission.

**V.**

**CLASSROOM CULTURE**

	Communicative Interactions	Never Occurred					Very Descriptive
16)	Students were involved in the communication of their ideas to others using a variety of means and media.	0	1	2	3	4	
17)	The teacher's questions triggered divergent modes of thinking.	0	1	2	3	4	
18)	There was a high proportion of student talk and a significant amount of it occurred between and among students.	0	1	2	3	4	
19)	Student questions and comments often determined the focus and direction of classroom discourse.	0	1	2	3	4	
20)	There was a climate of respect for what others had to say.	0	1	2	3	4	

**Student/Teacher Relationships**

21)	Active participation of students was encouraged and valued.	0	1	2	3	4	
22)	Students were encouraged to generate conjectures, alternative solution strategies, and ways of interpreting evidence.	0	1	2	3	4	
23)	In general the teacher was patient with students.	0	1	2	3	4	
24)	The teacher acted as a resource person, working to support and enhance student investigations.	0	1	2	3	4	
25)	The metaphor "teacher as listener" was very characteristic of this classroom.	0	1	2	3	4	

Additional comments you may wish to make about this lesson.

*Note.* From "Reformed Teaching Observation Protocol (RTOP): Reference Manual," by D. Sawada, M. Piburn, K. Falconer, J. Turley, R. Benford, and I. Bloom, 2000, *ACEPT Technical Report No. IN00-1*. Copyright 2000 by Evaluation and Facilitation Group of the Arizona Collaborative for Excellence in the Preparation of Teachers. Reprinted with permission.

## Appendix I

### Permission Letter for Reformed Teaching Observation Protocol

3/30/2017

Gmail - Permission to Use RTOP Tool in Dissertation



Katelyn Daplyn <kdaplyn@gmail.com>

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#### Permission to Use RTOP Tool in Dissertation

2 messages

**Katelyn Daplyn** <kdaplyn@gmail.com>  
To: mike.piburn@asu.edu

Thu, Mar 24, 2016 at 4:09 PM

Dr. Piburn,

Hello, my name is Katelyn Skinner. I am currently in the process of completing my doctoral dissertation in Educational Leadership at Rowan University in New Jersey. I am writing a qualitative case study dissertation on science and math teacher perceptions of a differentiation initiative implemented at a local high school. I was wondering if I would be able to obtain your permission to include the Reformed Teaching Observation Protocol tool as an appendix to my study. I hope to be able to use the tool to observe science and math teachers to make connections between the sense that was made about the differentiation reform effort and the strategies they are implementing in the classroom. I plan to undergo the online RTOP training in order to be effective at observing the participants.

If I am allowed to use the tool, would you be able to provide guidance as to how you would like me to cite it within the paper?

Please let me know if there is anything else you require in order to determine approval for usage. Thank you for your time and consideration.

Sincerely,

Katelyn Skinner

Katelyn Daplyn Skinner  
Doctoral Candidate of Educational Leadership  
Rowan University

---

**Michael Piburn** <mike.piburn@asu.edu>  
To: Katelyn Daplyn <kdaplyn@gmail.com>

Thu, Mar 24, 2016 at 5:17 PM

Kathleen,

Please feel free to use the RTOP in its original form and with appropriate citation. I don't know where you obtained the Instrument, but the most appropriate reference would be to the School Science and Mathematics article and/or to the Reference Manual.

Good luck with your work.

Mike

Sent from my iPad  
[Quoted text hidden]

## Appendix J

### Initial Code Book

#### Themes:

Initial Implementation Struggles with Defining

#### Codes (In Vivo and Descriptive):

“It’s just so open-ended”

“Haven’t heard a concrete  
definition”

Different than college

“Does this count as DI?”

Interpreted to be about activities to  
try

“Come up with different activities”

Initial confusion

“Educational Reform Trend”

Second and Third Year Acceptance

“Better Understanding”

“Giving Ourselves permission to do  
DI”

“It was more specific”

“was more part of the process”

Happy about it still being a goal

“People are still tired of it”

## Working Conditions Impacted Sense: Continuing Struggles

“Any of them that take time”

Many other initiatives taking place

“I just wish we had more time”

“Overwhelming to plan everything

DI”

“I prep enough”

Second Level vs. Third level change

## Professional Learning and Socialization Linked to Sense

“Coming out of college...that was the buzz”

“We would absolutely share it”

“I had a positive outlook for it.”

“We discussed how we would differentiate”

College experiences

Interactions within social groups

## Personal ties to detracking

“kids slipping through the cracks”

“they just needed to be able to graduate”

“Behavior issues in those classes”

“They can’t handle the material”

“They are not going to college”

“challenging because of the behavior issues”

“students given less responsibility”

Non-academic pathways for some students

Happy the goal was kept

Need more time

Contrasting successes

Values of learning impacting sense and implementation of differentiation

“different styles of learning” to

“teaching the way that students learn”

“Depends on who they are”

“tailoring your instruction”

“accessibility to the knowledge”

“accessibility for all students”

“when they’re comfortable”

“opportunities for them to feel comfortable”

DI and learning matched examples.

Teachers who did not match thoughts on how kids learn best

Some examples were carried out

## Change in Core Teaching Values and Emphases on Assessment Linked to Higher Scores

Prior major shifts in core beliefs

Major professional learning

“different that I would not have done  
before”

Change in assessment beliefs

“try individually to see where they  
are”

“it’s not just success in my terms.”

Turning point learning from college

## Appendix K

## Final Code Book

Theory	Theme	Research Question	Code	Evidence	Interpretation
Sensemaking	Initial Implementation Struggles with Defining	How do individual worldviews, experiences, and contextual factors impact the sense that teachers are making of the district differentiation goal?	In vivo	<p>“It’s just so open-ended”</p> <p>“Haven’t heard a concrete definition</p> <p>“Does this count as DI?”</p> <p>“Come up with different activities”</p> <p>“Educational Reform Trend”</p>	In the beginning of the change initiative teachers struggled with a clear definition of differentiation.
			Descriptive	<p>Different than college</p> <p>Interpreted to be about activities to try</p> <p>Initial confusion</p>	Teachers who struggled felt as though the change was extremely overwhelming and frustrating



Sensemaking	Second and Third Year Acceptance	How do individual worldviews, experiences, and contextual factors impact the sense that teachers are making of the district differentiation goal?	In vivo       Descriptive	<p>“Better Understanding</p> <p>“Giving Ourselves permission to do DI”</p> <p>“It was more specific”</p> <p>“was more part of the process”</p> <p>“People are still tired of it”</p> <p>Giving more time to process</p> <p>Clear definition makes a change easier to interpret</p>	<p>Many teachers commented that in the second year they felt less overwhelmed and felt more comfortable taking risks and trying new strategies.</p> <p>Spillane et al. discussion of the importance of having a clear definition of a reform effort.</p>
Sensemaking	Time seen as the enemy in preparing for effective activities.	How do individual worldviews, experiences, and contextual factors impact the sense that teachers are making of the district differentiation goal?	In vivo      Descriptive	<p>“I just wish we had more time”</p> <p>“Overwhelming to plan everything DI”</p> <p>“I prep enough”</p> <p>“Any of them that take time”</p>	<p>There were issues with teachers feeling as though they didn’t have enough time to implement differentiation.</p>

			ve	<p>Many other initiatives taking place</p> <p>Second Level vs. Third level change</p>	Teachers also felt overwhelmed by the number of other new initiatives being initiated at the same time.
Sensemaking	Professional Learning and Socialization on Feelings and Sense	How do individual worldviews, experiences, and contextual factors impact the sense that teachers are making of the district differentiation goal?	<p>In Vivo</p> <p>Descriptive</p>	<p>“Coming out of college...that was the buzz word”</p> <p>“We would absolutely share it with one another.”</p> <p>“I had a positive outlook for it.”</p> <p>“We discussed how we would differentiate”</p> <p>College experiences let to different feelings about the differentiation goal.</p> <p>Interactions within social groups impacted the sense that was</p>	<p>Professional learning experiences from various sources including college, district workshops, outsider workshops, and district summer academy impacted the sense that was made along with whether or not teachers felt positive or negative about the reform.</p> <p>Most teachers fit strategies into prior teaching practices.</p>



				<p>Happy the goal was kept</p> <p>Both agreed need more time to become more effective</p> <p>One having success and the other is not = one more wanting to bring general back</p>	offered.
Sensemaking	What the teachers valued about learning in general impacted their sense and implementation of DI in the classroom.	How does sensemaking relate to the reformed differentiated methods of instruction enacted by the teacher within the classroom?	<p>In vivo</p> <p>Descripti</p>	<p>“students have different styles of learning” to “teaching the way that students learn”</p> <p>“Depends on who they are” to “tailoring your instruction to the needs of the students”</p> <p>“to give accessibility to the knowledge” to “creating that accessibility for all students”</p> <p>“when they’re</p>	<p>Connections between DI and how students learned best demonstrate that teachers want to make DI work.</p> <p>Teachers were likely to provide examples of differentiated lessons that connected with their definition and examples provided of DI.</p>

			ve	<p>comfortable” to “opportunities for them to feel comfortable”</p> <p>Many definitions of DI and learning matched examples.</p> <p>Teachers who scored highest definitions did not match thoughts on how kids learn best</p> <p>Some examples were carried out in classroom while others were not</p>	<p>Three teachers stood out as not making connections between DI and how students learn best. These teachers scored on the higher end of RTOP.</p>
Sensemaking	A change in core beliefs about learning and assessments provided the highest RTOP scores.	How does sensemaking relate to the reformed differentiated methods of instruction enacted by the teacher within the classroom?	In vivo	<p>“We tried jigsaw, we tried choice menus”</p> <p>“We were all about getting our choice menus done.”</p> <p>“that’s an</p>	<p>Although the lower scoring teachers wanted to associate differentiation with how students learned best, their teaching techniques</p>

			Descriptive	<p>activity that we did that was different that I would not have done before”</p> <p>“I want them to try individually to see where they are”</p> <p>“it’s not just success in my terms, it’s success for them.”</p> <p>Prior major shifts in core beliefs</p> <p>Major professional learning</p> <p>Change in assessment beliefs</p>	<p>were not measured as effective.</p> <p>The major difference between teachers who had higher scores was a turning point in their educational career where prior notions were challenged about the way students are assessed and the way in which they learn.</p>
--	--	--	-------------	--	--